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**THE FUTURE OF THE
REGION 8 EQC/BEAUFORT
MICROBIOLOGY LABORATORY**

Penny Cornett
SCDHEC
December 15, 2010

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STATE DOCUMENTS

The Region 8 (Beaufort) Environmental Quality Control (EQC) office of the South Carolina Department of Health and Environmental Control (SCDHEC) covers the Counties of Beaufort, Jasper, Colleton and Hampton. The microbiology lab in Region 8 provides analytical support for the following programs: shellfish; ambient surface water monitoring (streams); wastewater; drinking water; beaches and swimming pools. The lab is certified by the U.S. Environmental Protection Agency (EPA) through the State Lab Certification program and by the U.S. Food and Drug Administration (FDA) for shellfish.

Because of limited resources and budget constraints, it has been suggested that the Region 8 lab be closed. This project will analyze three separate scenarios:

1. Keep the Region 8 lab fully functional;
2. Close the Region 8 lab and drive the samples to the Region 7 lab (Charleston) or ship the samples to the Columbia lab via the State courier service and;
3. Maintain limited capabilities at the Region 8 lab.

The primary analysis will be a cost analysis but other factors must also be considered.

The other factors discussed in the report are: disaster response; pressure from community groups; limited sampling days; the ability of staff to accomplish all required duties; and ease of scheduling/changing sampling days.

The data collected for this project came from 2009-2010 sampling chain of custodies, a personnel cost computation and mileage reimbursement rates (State Appropriations Act for Fiscal year 2009 – Appendix A), google maps, rates from a private courier service, average cooler weights, cost savings of leasing a smaller building

without lab space and DHEC's Standard Operating Procedures (SOP) for Environmental Microbiology (Appendix B). Analysis of the sampling chain of custodies gave an average collection time for each sampling run. Google maps was used to determine mileage and drive time from boat landings or sampling locations to the Region 8 lab or to the Region 7 lab. Mileage and drive time was also determined from the Region 8 lab to the Region 7 lab. With collection times, drive times and the personnel cost computation from the Bureau of Financial Management, the personnel cost to collect the samples and either drive them to the Region 8 or Region 7 lab was determined. That figure was then added to the mileage cost for a total cost. Analysis was also completed for two persons collecting the samples. DHEC's SOP for Environmental Microbiology was used to determine the required holding times for samples. This described data analysis was applied separately to each of the program areas. The actual cost of analyzing a sample was not included because that cost would be the same for any of the labs used.

Streams

"In an effort to evaluate the State's water quality, the SCDHEC collects data from a statewide network of primary and secondary ambient monitoring stations and flexible, rotating watershed monitoring stations."¹ Over the past year, there were 42 sample sites in Region 8 (22 fixed sites and 20 random sites). These 42 sample sites were collected on 9 separate stream routes. Areas 15, 16A and 16B were collected in conjunction with a shellfish route. Appendix C shows a map of the monitoring stations. The fixed sites are collected every other month while the rotating sites are collected monthly.

¹ www.scdhec.gov/environment/water/surface.htm

For streams, the EPA has set a maximum holding time of 6 hours for the sample to arrive at the lab and 8 hours to prepare the samples.² Therefore stream samples could not be shipped to the Columbia lab via the State courier service. The analysis for stream samples includes 3 hours in an incubator and then the samples are transferred to waterbaths. This means that the samples must arrive in the lab by 1:30 pm so the analyst can prepare the samples, get them into the incubator and then transferred to the waterbaths before they leave work at 5:00 pm.

There are additional samples collected once a year as part of the South Carolina Estuarine and Coastal Assessment Program (SCECAP). SCECAP is a joint effort between SCDHEC and SCDNR to monitor the condition of the State's estuarine habitats and associated biological resources. These samples are collected by Columbia staff and history has shown that it is difficult for them to get the samples to the Region 8 lab by 1:30 pm. It would take even longer to drive the samples to the Region 7 lab. There were 25 SCECAP samples analyzed at the Region 8 lab last year.

The detailed cost analysis for all 9 stream runs is in Appendix D. The analysis was conducted for 4 different scenarios:

1. One person collecting the samples and driving them to the Region 7 lab;
2. One person collecting the samples and driving them to the Region 8 lab;
3. Two persons collecting the samples - one person driving the samples to the Region 7 lab while the second person drives the boat to the Region 8 lab; and
4. Two persons collecting the samples and driving them to the Region 8 lab.

The analyses show that one person could not collect the samples and drive them to the Region 7 lab before the 1:30 pm deadline for any of the runs except the Ace/Hampton

² DHEC's SOP for Environmental Microbiology

run. This run does not require a boat for sample collection so calculations were not completed for 2 persons collecting the samples. The analyses also show that the least expensive option is one person collecting the samples and driving them back to the Region 8 lab. Table I shows the cost per area for each of the four scenarios.

TABLE I –STREAM RUNS

Route Name	1 person to Region 7	1 person to Region 8	2 persons to Region 7	2 persons to Region 8
Hilton Head	\$229.14 **	\$102.91	\$294.74	\$167.98
Chehaw	\$206.82 **	\$80.58	\$245.96	\$131.52
Pocawassie	\$224.38 **	\$98.15	\$281.00	\$168.38
Savannah	\$250.78 **	\$124.55	\$328.66	\$202.41
Coosaw Edisto	\$214.67 **	\$88.43	\$261.63	\$147.23
Area 15	\$226.88 **	\$101.09	\$287.08	\$176.72
Area 16A	\$223.65 **	\$97.41	\$279.59	\$165.18
Area 16B	\$228.91 **	\$102.67	\$289.86	\$172.69
Ace/Hampton	\$230.33	\$132.66		

** Arrive at lab after 1:30 pm

Shellfish

There are 298,912 surface acres of shellfish growing area in Region 8. There are 180 sample sites that are collected in 9 separate boat runs. In Appendix E there are maps of the monitoring stations. Shellfish season typically runs from September 15 – May 15 but water samples are collected year round. “The purpose of the monitoring is to provide data which accurately reflects the sanitary conditions of coastal shellfish and shellfish

growing waters in South Carolina and to ensure that the health of shellfish consumers are protected.³

Additionally, there are 3 conditionally approved management areas. These areas meet criteria for an approved classification except when there is excessive rainfall. Once closed, water samples are collected from these sites until satisfactory results are obtained. Satisfactory means that 10% of the samples must be less than 43 MPN (most probable number) per 100 mL. Last year, 39 conditional area samples were analyzed in the Region 8 lab.

The National Shellfish Sanitation Program (NSSP) is the federal/state cooperative program recognized by the FDA and the Interstate Shellfish Sanitation Conference (ISSC) for the sanitary control of shellfish produced and sold for human consumption.⁴ The State must have a program recognized by the FDA so that local harvesters can move their product across state lines. The FDA evaluates state programs to ensure compliance with the Model Ordinance.

The FDA has set a maximum holding time of 30 hours for shellfish water samples.⁵ These samples could be sent to the Columbia lab via the State courier service. The analysis takes 24 hours so sampling days would be limited to Monday –Wednesday. On July 28, 2010, Karen Suber, manager of the Environmental Microbiology lab in Columbia stated that her lab could not take on any additional samples without hiring another analyst and another person in the media preparation area. She also stated that she

³ www.scdhec.net/environment

⁴ www.fda.gov

⁵ DHEC's SOP for Environmental Microbiology

would need additional space for an autoclave and incubator. The Columbia lab is not certified by FDA for shellfish analysis so they would have to work through that process.

The Region 7 lab is certified by the FDA for shellfish analysis and could handle Region 8's samples with their existing lab space and their three lab personnel. It must be noted that two of the three lab staff are eligible for retirement and the third can retire in seven years. The state courier does not run between Beaufort and Charleston so the samples would have to be driven to Charleston after collection. Samples could be collected Monday-Thursday provided that Thursday samples arrived at the lab before 1:30 pm.

The detailed cost analysis for all 9 shellfish runs is in Appendix F. As with streams, the analysis was conducted for four different scenarios. The analyses show that one person could not collect the samples from Areas 13, 15, 16A, 16B, 17, 19 or 20 and get them to the Region 7 lab before 1:30 pm so these samples could not be taken to the Region 7 lab on Thursdays unless two persons collected the samples. The analyses also show that for every sampling area, the least expensive option is one person collecting and driving the samples back to the Region 8 lab for analysis. Table II shows the cost per area for each scenario. Calculations were not completed for 2 persons collecting the samples in Area 13 because the landing is so close to Region 7.

TABLE II – SHELLFISH RUNS

Route Name	1 person to Region 7	1 person to Region 8	2 persons to Region 7	2 persons to Region 8
Area 13	\$198.55 **	\$155.04 **		
Area 14	\$201.02	\$74.79	\$228.69	\$124.60
Area 15	\$226.88 **	\$100.64	\$286.18	\$181.87
Area 16A	\$223.65 **	\$97.41	\$279.59	\$165.18
Area 16B	\$228.91 **	\$102.67	\$289.86	\$172.69
Area 17	\$214.06 **	\$87.82	\$260.12	\$147.74
Area 18	\$203.07	\$76.83	\$238.36	\$125.75
Area 19	\$241.04 **	\$114.80	\$318.52	\$191.77
Area 20	\$236.55 **	\$110.31	\$309.54	\$182.79

** Arrive at lab after 1:30 pm.

Beaches

Routine monitoring of beaches in Beaufort and Colleton counties began in 2000. In October 2000, the Beaches Environmental Assessment and Coastal Health (BEACH) Act was signed into law, amending the Clean Water Act. There are 42 sample sites for the beaches in Beaufort and Colleton counties that are collected in three separate routes. Fourteen sites are collected from Hilton Head Beaches, fourteen sites are collected from Fripp, Harbor and Hunting Island beaches and fourteen sites are collected from Edisto Beach. The beach season runs from May 15 - October 15. The 42 sites are collected once in May and October and twice per month for June – September. If the result at any site is greater than 104 CFU/100 mL (colony forming unit), that site is sampled daily

until the result falls below 104 CFU/mL. Last year 433 beach samples were collected and analyzed in the Region 8 lab.

The EPA has set a maximum holding time of 6 hours for the sample to arrive at the lab and 8 hours to prepare the samples.⁶ Therefore beach samples could not be sent to the Columbia lab via the state courier service. The analyses in Appendix G show that neither the Hilton Head beach run nor the Fripp, Harbor and Hunting Island beach run could be collected and driven to the Region 7 lab within the required six hour holding time. The Edisto Beach run could make it to the Region 7 lab within six hours but the cost analysis shows it is less expensive to drive the samples to the Region 8 lab. Plus, the Region 8 lab would still have to maintain equipment and personnel to analyze the samples from the Hilton Head run and the Fripp, Harbor and Hunting Island run.

Drinking Water

There are 232 public drinking water systems in Region 8 EQC. The required bacteriological monitoring is dictated by EPA's Total Coliform Rule and The Groundwater Rule. Each public water system must have a minimum of one sample collected per year. For simplicity, Region 8 EQC samples all 232 public drinking water systems in the first quarter of each year. Quarterly samples are required on systems with previous unsatisfactory sample results and/or unsatisfactory inspections. An average of 42 samples per quarter are collected for the remaining three quarters. There are 13 sampling routes. The Region 8 lab also analyzes bacteriological samples for private citizens. These average 8 samples per month.

⁶ DHEC's SOP for Environmental Microbiology

The EPA has set a maximum holding time of 30 hours for total coliform/e.coli in drinking water.⁷ These samples could be sent to the Columbia lab via the state courier but sampling would be limited to Mondays only to ensure that repeat sampling could be collected within 24 hours. The total coliform rule requires that repeat samples are collected within 24 hours of notification by the lab of positive results for all transient non-community water systems (e.g. restaurants, convenience stores). Best practices indicate that repeat samples be collected within 24 hours for all positive results on all water systems. To elaborate, samples collected on Monday would arrive in the Columbia lab Tuesday morning. The analysis takes 24 hours so the lab would read the results Wednesday morning. Any unsatisfactory sites would be recollected and shipped to the Columbia lab Wednesday afternoon for analysis Thursday morning. These results would be read on Friday.

The detailed cost analysis for drinking water is in Appendix H. While the cost to ship the samples to the Columbia lab is minimal, the limited sampling days would be burdensome to regional staff. The Region 7 and Region 8 laboratories accept drinking water samples Monday – Thursday. Transient non-community systems can be collected Monday – Wednesday. The least expensive option is to collect the drinking water samples and drive them to the Region 8 lab for analysis. Table III shows the cost to drive the samples to Region 7 versus driving the samples to Region 8.

⁷ DHEC's SOP for Environmental Microbiology

TABLE III – DRINKING WATER RUNS

Route Name	Drive to Region 7 Lab	Drive to Region 8 Lab
Beaufort 1	\$178.33	\$61.45
Beaufort 2	\$167.80	\$56.51
3&7 (x)	\$152.58	\$81.15
3&7 (y)	\$152.58	\$81.15
3&7 (z)	\$152.58	\$81.15
4A	\$183.33	\$85.49
4B	\$166.00	\$74.11
5	\$218.58	\$98.41
6	\$199.00	\$87.43
8	\$129.64	\$75.69
9	\$218.58	\$98.41
10A	\$194.36	\$107.76
10B	\$194.36	\$107.76

Wastewater and Swimming Pools

There is no routine monitoring for wastewater or swimming pools in Region 8. Sampling may be necessary in a complaint investigation. The EPA has set a maximum holding time of 6 hours for both wastewater and swimming pool samples.⁸ With prior authorization, it would be possible to collect one complaint investigation sample and drive it to the Region 7 lab within the 6 hour limit. During the past year, no samples

⁸ DHEC's SOP for Environmental Microbiology

were collected from swimming pools. There were 4 wastewater samples collected and analyzed in the Region 8 lab.

PDQ

The private courier service, PDQ, was contacted on August 6, 2010. PDQ can courier samples from Beaufort to Charleston but they cannot guarantee an arrival time at the Region 7 lab before 1:30 pm. Per Eric at PDQ, their rates are \$2.30 per mile plus \$6.00 per pound. There is a seventy pound limit per cooler.

Neither the stream nor beach samples could be collected and then transported by PDQ within the required holding times. The shellfish samples and the drinking water samples are possible.

There are 9 Shellfish runs per month. The average weight of the coolers + ice + samples is 42 pounds. The average weight of the empty coolers is 15 pounds. At \$2.30 per mile, the mileage cost from the Region 8 lab to the Region 7 lab is \$149.50. The total cost per month to send the shellfish samples via PDQ is:

$(9 \text{ runs})(\$149.50/\text{run}) + (42 \text{ lb/cooler})(\$6/\text{lb})(9 \text{ coolers}) + (15 \text{ lb/cooler})(\$6/\text{lb})(9 \text{ coolers})$
= \$4423.50/month. The cost for 1 person to collect the samples and drive them back to the Region 8 lab for analysis is \$920.31/month.

Building Costs

The Region 8 lab is currently housed in a 10, 270 square foot building. The office space occupies 8,502 square feet and the lab occupies 1,768 square feet. The cost of leasing the building is \$16.88 per square foot. OCRM (Office of Ocean and Coastal Resource Management) occupies a portion of the office space (4 employees) and pays 25% of the costs (lease, electric, water and sewer). Due to budget reductions, they have indicated that they may close the office in Beaufort and move the 4 staff to Charleston.

On November 1, 2010, Environmental Sanitation became a part of EQC. They have 10 staff and have expressed an interest in moving to our building. If OCRM were to move, Environmental Sanitation could move into that space. The lab space costs \$29,843.84 per year to lease. This is considerably less than the cost to ship samples to the Columbia lab or drive them to the Region 7 lab (Appendix I).

A building without a lab would require 8,500 square feet of office space, a fenced area for boat storage, room for a storage shed and enough parking for staff and clients. Currently, there is not adequate office space available in Beaufort, Jasper, Colleton or Hampton counties (Appendix J). There are warehouse spaces available but it would be costly to turn a warehouse into office space. The largest available office space is 5084 square feet. The going rate for office space is \$9 - \$12 per square foot. It could be advantageous to attempt to re-negotiate the contract on the existing space.

Summary

The Region 8 microbiology lab provides analytical support for water programs. The project goal was to determine if the Region 8 lab should be kept fully operational, partially operational or closed completely.

One option is to courier the shellfish and drinking water samples to the Columbia lab. The stream and beach samples could not be sent to Columbia because of the 6 hour holding times. The cost of shipping the shellfish and drinking water samples to Columbia is \$139,146.00 per year (Appendix I). This includes the cost of hiring 2 additional lab staff per the Columbia lab manager. Drinking water sampling would be limited to Mondays and shellfish sampling would be limited to Monday-Wednesday.

The Columbia lab is not certified by FDA and they would need more space for additional equipment.

A second option is to drive the collected samples to the Region 7 lab. The Hilton Head and Fripp, Harbor and Hunting Island beach samples could not get to the Region 7 lab within the 6 hour holding time. For streams, 2 persons would have to collect the samples in order to get them to the lab by 1:30 pm. The total cost per year to drive the samples to the Region 7 lab is \$230,839.62 (Appendix I).

The third option is to analyze the collected samples at the Region 8 lab. As shown in Appendix I, the total cost per year, including hiring a Manager I to run the lab, is \$70,010.00. This is considerably less than driving the samples to the Region 7 lab or shipping them to the Columbia lab via the State courier. As mentioned earlier, two of the three lab staff in Region 7 are eligible for retirement. If the Region 8 lab is kept fully functional, only one of the retired staff in Region 7 would need to be replaced. This hire could be downgraded to a Manager I. The cost of the lab staff in Region 7 then becomes \$99,201.50/yr. The cost to analyze the samples in Region 8 plus the cost of the lab space is \$99,853.84/yr. The cost to keep both labs fully functional is \$199,055.64/yr. This is less than the \$230,839.62/yr required to drive the samples to the Region 7 lab.

There are also other considerations besides cost. The shellfish officers collect the shellfish and the stream samples. This sampling requires 15 half-days if the samples are brought back to the Region 8 lab or 15 full days if the samples are driven to the Region 7 lab. The FDA requires a minimum of 40 closed area patrols per month. There is an average of 22 work days per month. If the samples are driven to the Region 7 lab, that leaves only 7 days per month for patrols, plant inspections, entering/reviewing data,

staff meetings and complaints. It would not be possible to get all of the work completed. The position descriptions for the Region 8 shellfish manager and the two shellfish officers are included in Appendix K. The shellfish officers complete the field work while the manager performs the administrative duties. The manager would step in to complete the duties of a shellfish officer in the event of an illness or vacancy. The State shellfish manager would then perform the duties of the Region 8 shellfish manager.

The only two labs in the State certified by the FDA for shellfish analysis are the Region 7 lab and the Region 8 lab. Both regions are on the coast and vulnerable to hurricanes. If the Region 8 lab were closed and the Region 7 lab was disabled due to a hurricane, there could be no analysis of shellfish waters or meats. Due to holding time restrictions, neither beaches nor streams could be sampled and analyzed. As the oil spill in the Gulf has shown, disaster can strike anytime. One of the inefficiencies uncovered during the oil spill was that there were not enough certified labs in the area to run all the necessary samples.

The health of the streams and shellfish harvesting locations in Region 8 receive much public oversight. The following groups meet regularly to scrutinize our data: Friends of the Rivers; Together for Beaufort; the Coastal Conservation League; and the Beaufort County Stormwater Committee. These groups have asked that more sampling and analysis be done. This would not be possible without the lab in Region 8.

Because of holding times for beach samples, the Region 8 lab could not be closed completely. Staff and equipment must be maintained to run these samples and perform the required quality control. The cost analyses and the considerations listed above indicate that the best option is to keep the Region 8 lab fully functional.

APPENDIX A

**STATE APPROPRIATIONS ACT FOR
FISCAL YEAR 2009**

Appendix VII Mileage Reimbursement Rate for FY09

Subject: Mileage Reimbursement Rate Increase for FY09
Date: Mon, 30 Jun 2008 13:03:03 -0400
From: "Mary B. Long" <LONGMB@dhec.sc.gov>

This email has been approved for distribution to DHEC_All. If it doesn't apply to you, please delete with my apologies.

We received notification via the State Appropriations Act for FY09 that the mileage reimbursement rate will increase effective July 1, 2008.

The rates for regular mileage will increase from 44.5 cents to 50.5 cents per mile.

The rates for reduced mileage will increase from 40.5 cents to 46.5 cents per mile.

These rates will go into effect July 1, 2008, however, the TravWin Program will not be updated to reflect this change until on or about July 17, 2008. This is to allow time to complete processing of travel for FY08. Travel for FY09 should not be entered into the TravWin system until the rates have been changed. Notification will be sent out once the TravWin system has been updated for the change.

If you have any questions for concerns, do not hesitate to contact me.

Thank you

Mary B. Long, Division Director
Accounts Payable and Records
Department of Health & Environmental Control
Bureau of Financial Management
Phone: (803)898-3428
Fax: (803)253-7637
Email: longmb@dhec.sc.gov

Appendix VI

Personnel Salary /Fringe Benefits

Subject: Re: Fwd: Cost
Date: Thu, 16 Oct 2008 13:59:19 -0400
From: "Debra Lybrand" <LYBRANDW@dhec.sc.gov>
To: "Buck W. Graham" <GRAHAMBW@dhec.sc.gov>
Cc: "Ronnie P. Belleggia" <BELLEGRP@dhec.sc.gov>

Buck,
Ronnie Belleggia in Financial Mgt. forwarded this to me. To be honest, we don't have information in the format you're wanting. I'll try to do the best I can to help you figure out some cost.

I would assume that most of the individuals responding to open burning issues are EHM I's. So, I'm going to provide the current hiring level with a 30% fringe rate. From this we can devise an hourly rate that can apply to hours found in EFIS.

EHM I Salary \$31,484

Fringe @ 30% \$9,445

Total Cost \$40,929

\$40,929 divided by 2,080 hours equals \$19.67 hourly rate

As far as the vehicle/fuel cost, that's much harder to determine. In EQC we track expenditures by vehicle and really don't have an "average". I would suggest using the same reimbursement rate per mile that the state uses to reimburse individuals. This is supposed to cover depreciation, gasoline, etc.

Hope this helps,
Debra Lybrand
Administrative Manager
Environmental Quality Control Administration

APPENDIX B

**STANDARD OPERATING PROCEDURE
FOR
ENVIRONMENTAL MICROBIOLOGY**



**Bureau of Environmental Services
Analytical and Radiological Environmental Services Division**

STANDARD OPERATING PROCEDURE

FOR

ENVIRONMENTAL MICROBIOLOGY

REVIEWER:

DIVISION DIRECTOR:

BES QA OFFICER:

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11-30-09

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11-30-09

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Glassware, Sample Containers, Preservation, and Maximum Holding Times for Microbiological Analysis

Control of the quality of laboratory analyses begins with the sample collection. The validity of analytical results obtained depends upon a representative sample of the source from which it was collected. The concentration of each constituent in a sample at the time of collection must be maintained until all analyses have been completed. Constituent concentrations may be altered after collection through contamination of the container, reactions between sample components and the container walls, and through naturally occurring reactions within the sample itself. This section contains the methodology employed by the Laboratories to control those factors which can affect sample validity. The actual sample collection procedures are not included in this manual. Refer to Environmental Quality Control Environmental Investigations Standard Operating Procedure and Quality Assurance Manual for detailed information.

Maximum holding times have been set by the United States Environmental Protection Agency (USEPA) for each parameter because sample concentration levels cannot be maintained indefinitely at the collection time level. Analyses must be completed as soon as possible but must never exceed the maximum holding time for valid results.

In the Columbia Laboratory, when a sample exceeds the holding time for a parameter, the analyst will notify the Laboratory Section Manager immediately. The Section Manager must notify the Division Director that the sample(s) analysis has exceeded holding time and state the reason for the late analysis. The Division Director will notify, or instruct the Laboratory Section Manager to notify, the EQC Program Director receiving the service. A reason for the disruption in quality service will be given to the EQC Program Manager.

If the EQC Program Manager requests the sample(s) be analyzed beyond the holding time, the analysis will be performed, but recorded in the workbook and reported on the data sheet with the notation "sample analysis exceeded maximum holding time". If no specific request for analysis beyond holding time is received from the EQC Program Manager, the sample is recorded in the workbook and reported in the data sheet "lab error, instrument failure/problem, or analytical problem" with the notation "sample analysis exceeded maximum holding time".

In the Regional Laboratories, when a sample exceeds the maximum holding time for a parameter, the analyst will notify the supervisor immediately. The Regional Laboratory Manager will notify the District Director that the sample analysis time has been exceeded. The Regional Laboratory Manager will notify the EQC Program Manager receiving the analytical service that the holding time has been exceeded and give a reason for the disruption in quality service.

If the EQC Program Manager requests the sample(s) be analyzed beyond the holding time, the analysis will be performed, but recorded in the workbook and reported on the data sheet with the notation "sample analysis exceeded maximum holding time". If no specific request for analysis beyond holding time is received from the EQC Program Manager, the sample is recorded in the workbook and reported in the data sheet "lab error, instrument failure/problem, or analytical problem" with the notation "sample analysis exceeded maximum holding time".

Table IV-B-1-1 lists the container, preservation, and maximum holding time requirements for drinking water microbiological samples. Table IV-B-1-2 lists the container, preservation, and maximum holding time requirements for non-drinking water microbiological samples.

Table IV-B-1

Drinking Water Microbiological Samples

Parameter(s)	Bottle Label	Number, Size, and Type of Containers	Preservation and Temperature	Maximum Holding Time
Total Coliforms	None	1- 125 mL or 290 mL, clear sterile plastic	Sodium Thiosulfate ² , Cool $\leq 10^{\circ}\text{C}$	30 hours
Heterotrophic Bacteria (SimPlate)	None	1- 125 mL or 290 mL, clear sterile plastic	Sodium Thiosulfate ² ; Cool, $\leq 10^{\circ}\text{C}$	8 hours
Iron Related Bacteria	None	1- 125 mL or 290 mL, clear sterile plastic	Sodium Thiosulfate ²	30 hours
² Added prior to shipment.				

Table IV-B-2

Non-Drinking Water Microbiological Samples

Parameter(s)	Bottle Label	Number, Size, and Type of Containers	Preservation and Temperature	Maximum Holding Time
Fecal Coliform – MPN, MFC	None	1 – 110 mL or 250 mL, sterile plastic or amber glass	Sodium Thiosulfate ² ; Cool, $\leq 10^{\circ}\text{C}$	6 hours transport time (NPDES and Surface Waters) 8 hours maximum
Fecal and Total Coliform; E-Coli	None	1 – 110 mL or 250 mL, sterile plastic or amber glass	Sodium Thiosulfate ² ; Cool, $\leq 10^{\circ}\text{C}$	6 hours (Solid Waste) (Recreational Waters) (Source Waters-SWTR)
Fecal and Total Coliform	None	1 – 110 mL or 250 mL, sterile plastic or amber glass	Cool, $\leq 10^{\circ}\text{C}$	30 hours (Shellfish Waters)
Fecal Coliform-E. coli and HPC	None	Clean water proof and puncture resistant container	Cool, $\leq 10^{\circ}\text{C}$	24 hours (Shellfish Meats)
Enterococci-Enterolert	None	1 – 110 mL or 250 mL, sterile plastic or amber glass	Sodium Thiosulfate ² ; Cool, $\leq 10^{\circ}\text{C}$	6 hours transport time
² Added prior to shipment.				

Environmental Microbiology Sample Types and Analysis Required

The Environmental Microbiology Laboratories analyze drinking water, wastewater, stream water, and saline water samples for several indicator organisms. This requires a variety of different methods. The methods used must be EPA approved for all procedures except shellfish. Shellfish analyses must be FDA approved procedures.

The ideal microbiological analysis for any indicator is the one with the shortest turn around time and the most sensitive level of detection. However, due to state regulations and EPA regulations it is not always possible to use a method with the shortest turn around time.

Below is a diagram of the analysis required and various methods available for drinking water, non-drinking water, shellfish waters and meats, and the completion times for each.

Types of Microbiology Samples and Analysis Required

Drinking Water

Charge Codes

Analysis required for Drinking Water -Total Coliform

DWT
WSP
WSR

WSR-I
PWP

Methods for Total Coliform

WMMO –Colilert 24, Colilert-18, Colisure

TCMF-(Membrane Filter)
P/A-(Presence/Absence)

Non-Drinking Water Samples

Analysis required for Non-Drinking Water Samples - Fecal Coliform/E. Coli

Charge Codes

WPC
NPS

Methods for Fecal Coliform/ E.Coli

MPN-F
A-1 Fecal

Facilities, complaints, ponds, ditches

Quanti-Tray (E.Coli) - complaints only

MFC - Streams & complaints

A-1 Fecal - Salt Water Streams

Shellfish Water Samples -- A-1 Fecal

Shellfish Meat Samples -- MPN (LTB)/EC+MUG
HPC (Standard Plate Count)

Beach Front Monitoring (BFM) -- Enterococci Quanti-Tray

Length of Time Required for Completion of Test Results

Defined Substrate Test (DST) for Total Coliform and *Escherichia coli*:

Colilert – 24 - 28 hours

Coli-18 – 18 - 22 hours

Colisure - 24 to 48 hours

Enterolert – 24 - 28 hours

MPN (Most Probable Number)

Total Coliform: up to 96 hours

Fecal Coliform/E.Coli: up to 72 hours

A-1 Fecal: 24 hours

Membrane Filter Test

Total Coliforms: 24 hours - if verified: 24 - 48 hours (possibly 72 hours for results)

Fecal Coliforms: 24 hours - if verified: 24 - 48 hours (possibly 72 hours for results)

P/A (Presence/Absence) Coliform Test: Up to 96 hours

Heterotrophic Plate Count

Plate Count Agar at 35°C: 48 hours

SimPlate at 35° C: 45 - 72 hours

Iron Bacteria

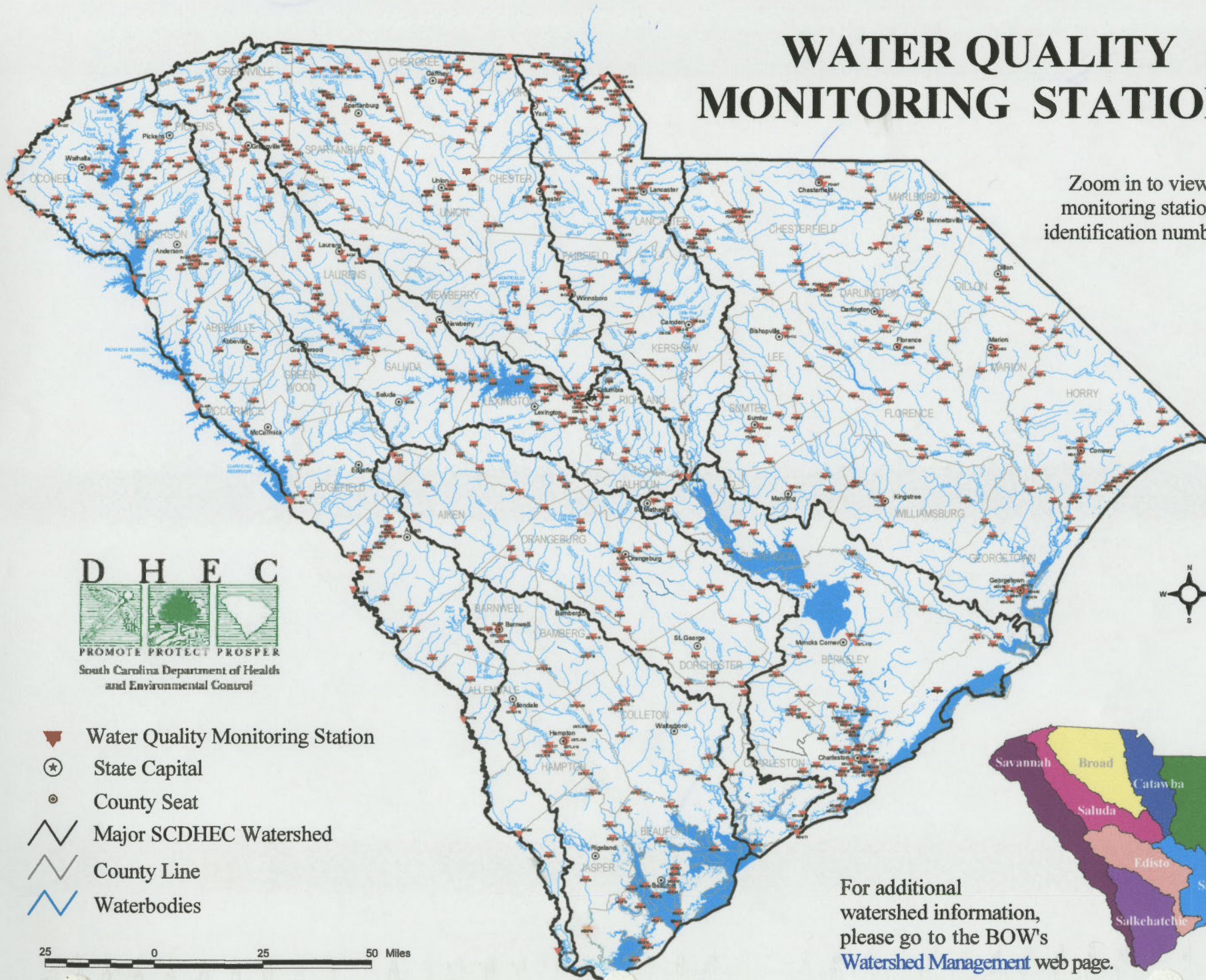
Biological Activity Reaction Test (BART™) - 8 days

APPENDIX C

WATER QUALITY MONITORING STATIONS

WATER QUALITY MONITORING STATIONS

Zoom in to view monitoring station identification numbers



South Carolina Department of Health and Environmental Control

- ▼ Water Quality Monitoring Station
- ★ State Capital
- ⊙ County Seat
- ▬ Major SCDHEC Watershed
- ▬ County Line
- ▬ Waterbodies

25 0 25 50 Miles

For additional watershed information, please go to the BOW's [Watershed Management](#) web page.



APPENDIX D

COST ANALYSIS FOR STREAM SAMPLES

The following are constants used in the stream run and shellfish calculations:

1. The first sample is collected at 0830 am.
2. For one person collecting the samples, the boat must first be dropped off at the Region 8 office before driving the samples to the Region 7 lab.
3. The mileage from the Region 8 office to the Region 7 lab is 65 miles and the drive takes 1 hour and 21 minutes.
4. It takes 30 minutes to hook up the boat and get gas.
5. It takes 15 minutes to unhook the boat.
6. When 2 people collect the samples, it takes 30 minutes off of the collection time.
7. The two shellfish officers collect the stream and shellfish samples that require a boat. The average per hour salary of the two shellfish officers in Region 8 is \$22.44. This was calculated using their base salary plus 30% to cover benefits. (Memo from Debbie Lybrand – Appendix A).

Below is a detailed example of the calculations used to determine the total cost per run. The table that follows shows all of the numbers used in the calculations.

Hilton Head Stream Run

1 Person collecting and driving samples to Region 7 Lab

2 hr 27 min to collect

30 min to hook up boat/get gas

42 min from landing to Region 8

30.48 miles

15 min to unhook boat

1 hr 21 min to Region 7 lab

65 miles

5 hr 15 min, arrive at Region 7 lab at 1:45

1 hr 21 min from Region 7 lab to Region 8

65 miles

6 hr 36 min (6.6 hr)

(160.48 mi)(\$.505/mi) = \$81.04

Staff: $(\$22.44/\text{hr})(6.6\text{hr}) = \$148.10 + \$81.04 = \229.14

1 Person collecting and driving samples to Region 8 Lab

2 hr 27 min to collect

30 min to hook up boat/get gas

42 min from landing to Region 8

(30.48 mi)(\$.505/mi) = \$15.39

3 hr 39 min, arrive at Region 8 lab at 12:09

15 min to unhook boat

3 hr 54 min (3.9 hr)

Staff: $(\$22.44/\text{hr})(3.9 \text{ hr}) = \$87.52 + \$15.39 = \102.91

2 Persons Collecting: P1 drives samples to Region 7; P2 drives boat back to Beaufort

P1: 1 hr 57 min to collect

2 hr 10 min from landing to Region 7 Lab

(94 mi)

4 hr 7 min, arrive at Region 7 lab at 12:37

1 hr 21 min from Region 7 to Region 8

(65 mi)

5 hr 28 min (5.47 hr)

(159 mi)(\$.505/mi) = \$80.30

P1: $(\$22.44/\text{hr})(5.47 \text{ hr}) = \$122.75 + \$80.30 = \203.05

P2: 1 hr 57 min to collect

30 min to hook up boat/get gas

42 min from landing to Region 8

(30.48 mi)(\$.505/mi) = \$15.39

15 min to unhook boat

3 hr 24 min (3.4 hr)

P2: $(\$22.44/\text{hr})(3.4 \text{ hr}) = \$76.30 + \$15.39 = \91.69

P1 + P2 = \$294.74

2 Persons collecting and driving samples to Region 8 lab

1 hr 57 min to collect

30 min to hook up boat/get gas

42 min from landing to Region 8 lab

(30.48 mi)(\$.505/mi) = \$15.39

3 hr 9 min, arrive at Region 8 Lab at 11:39

15 min to unhook boat

3 hr 24 min (3.4 hr)

P1 + P2 = $(\$22.44/\text{hr})(3.4 \text{ hr})(2 \text{ persons}) = \$152.59 + \$15.39 = \167.98

Data for Stream Run Calculations

Stream Run	Time to collect	Time from landing to Region 8	Miles from landing to Region 8	Time from landing to Region 7	Miles from landing to Region 7
Hilton Head	2 hr, 27 min	42 min	30.48	2 hr, 10 min	94
Chehaw	2 hr, 2 min	29 min	14.26	1 hr, 46 min	78
Pocawassie	3 hr, 8 min	15 min	10.84	1 hr, 32 min	74
Savannah	2 hr, 47 min	56 min	48	2 hr, 3 min	109
Coosaw-Edisto	2 hr, 23 min	29 min	14.26	1 hr, 46 min	78
Area 15	3 hr, 26 min	10 min	6	1 hr, 27 min	70
Area 16A	2 hr, 47 min	29 min	14.26	1 hr, 46 min	78
Area 16B	2 hr, 44 min	38 min	20.24	1 hr, 55 min	83.5
**Ace/Hampton	2 hr, 30 min	44 min	38	1 hr, 4 min	48.45

**Boat not required for this run. Collected by a staff member with a salary of \$35.13/hr.

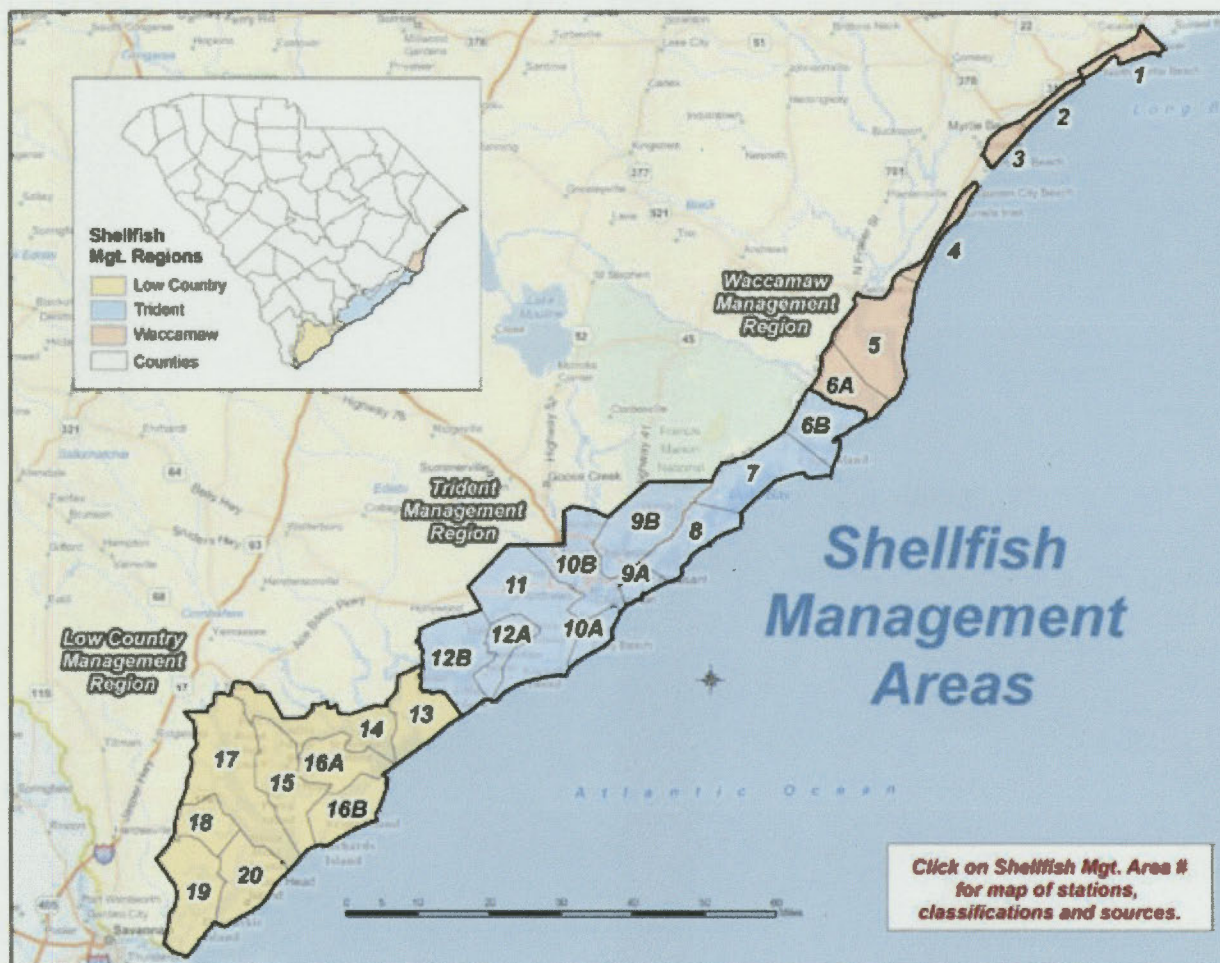
APPENDIX E

SHELLFISH MONITORING STATIONS

Shellfish Program

Shellfish Maps

Monitoring Stations Locations, Area Classifications and Potential Pollution Sources



Bureau of Water . Phone: (803) 898-4300 . Fax: (803) 898-3795 . [Contact Us](#)

Figure 1.
Shellfish Growing Area 13
*Harvest Classifications,
 Stations and Potential Pollution Sources*

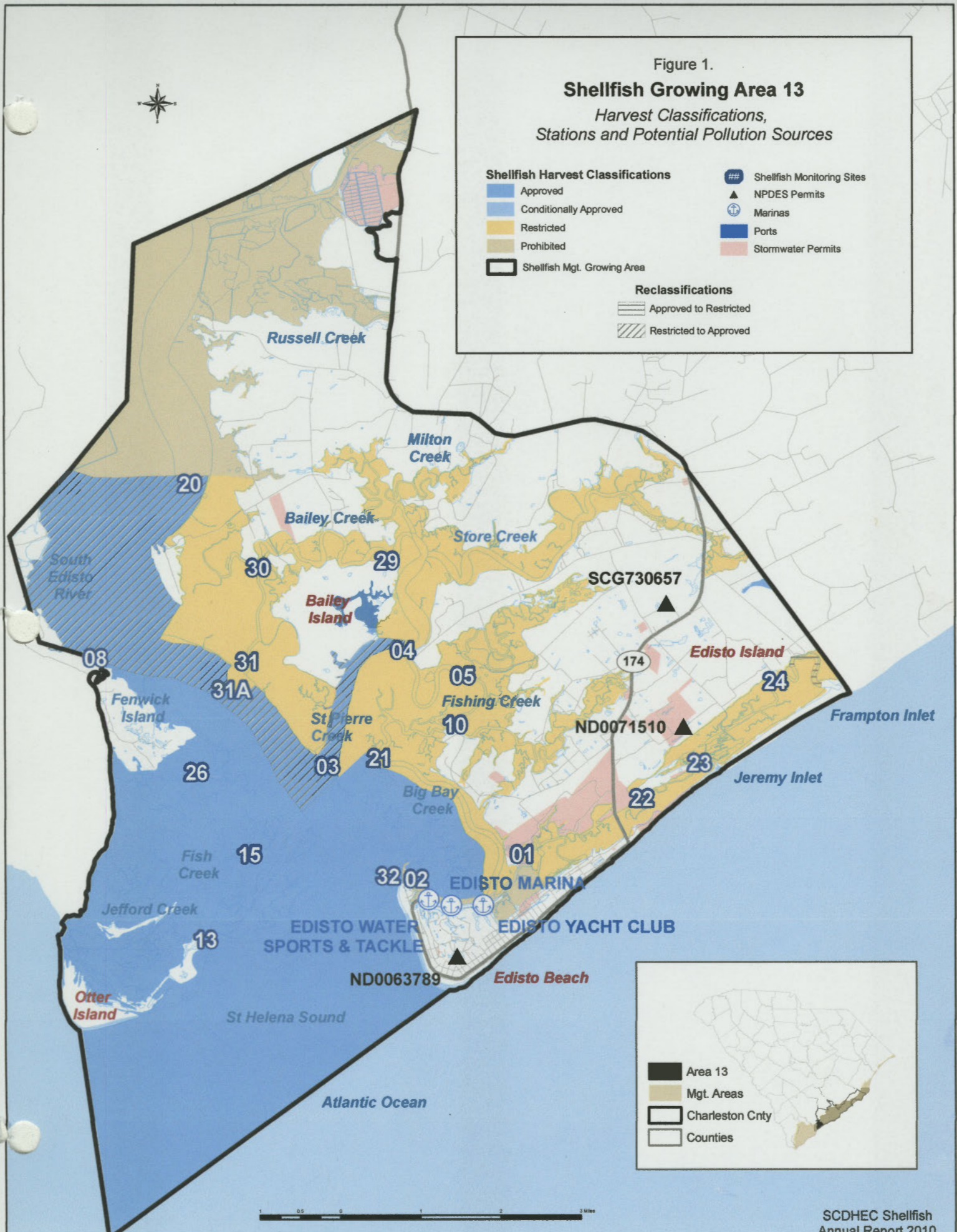


Figure 1.
Shellfish Growing Area 14
Harvest Classifications, Stations and Potential Pollution Sources

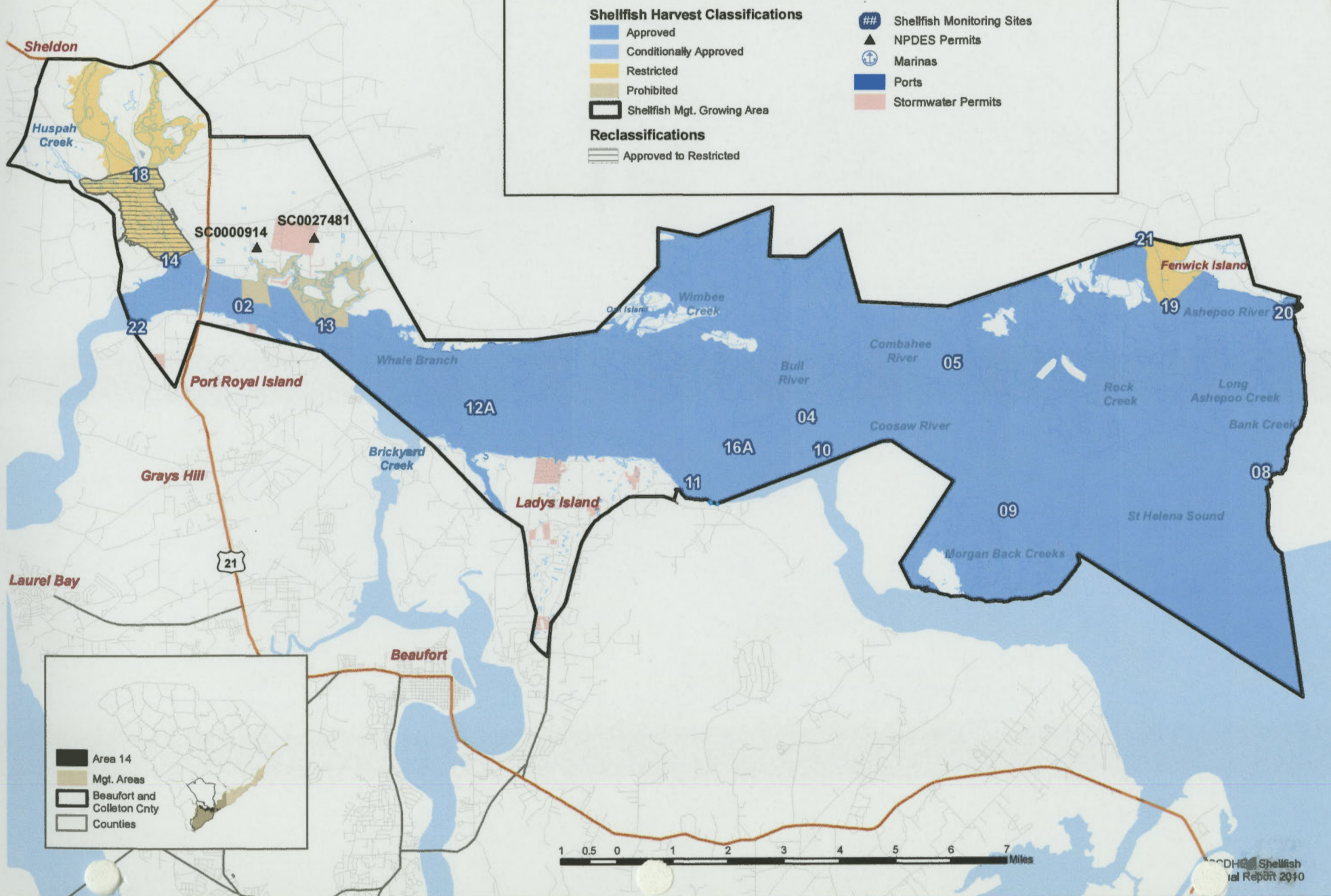


Figure 1.
Shellfish Growing Area 15
*Harvest Classifications,
 Stations and
 Potential Pollution Sources*

- ## Shellfish Monitoring Sites
- ▲ NPDES Permits
- Ⓜ Marinas
- Ports
- Stormwater Permits

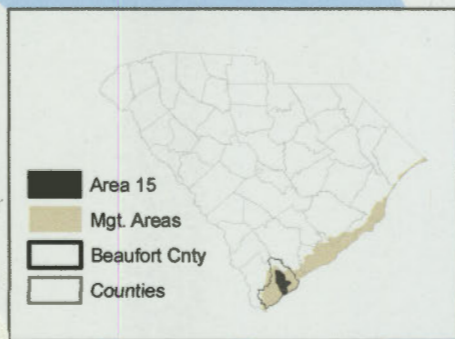
Shellfish Harvest Classifications

- Approved
- Conditionally Approved
- Restricted
- Prohibited

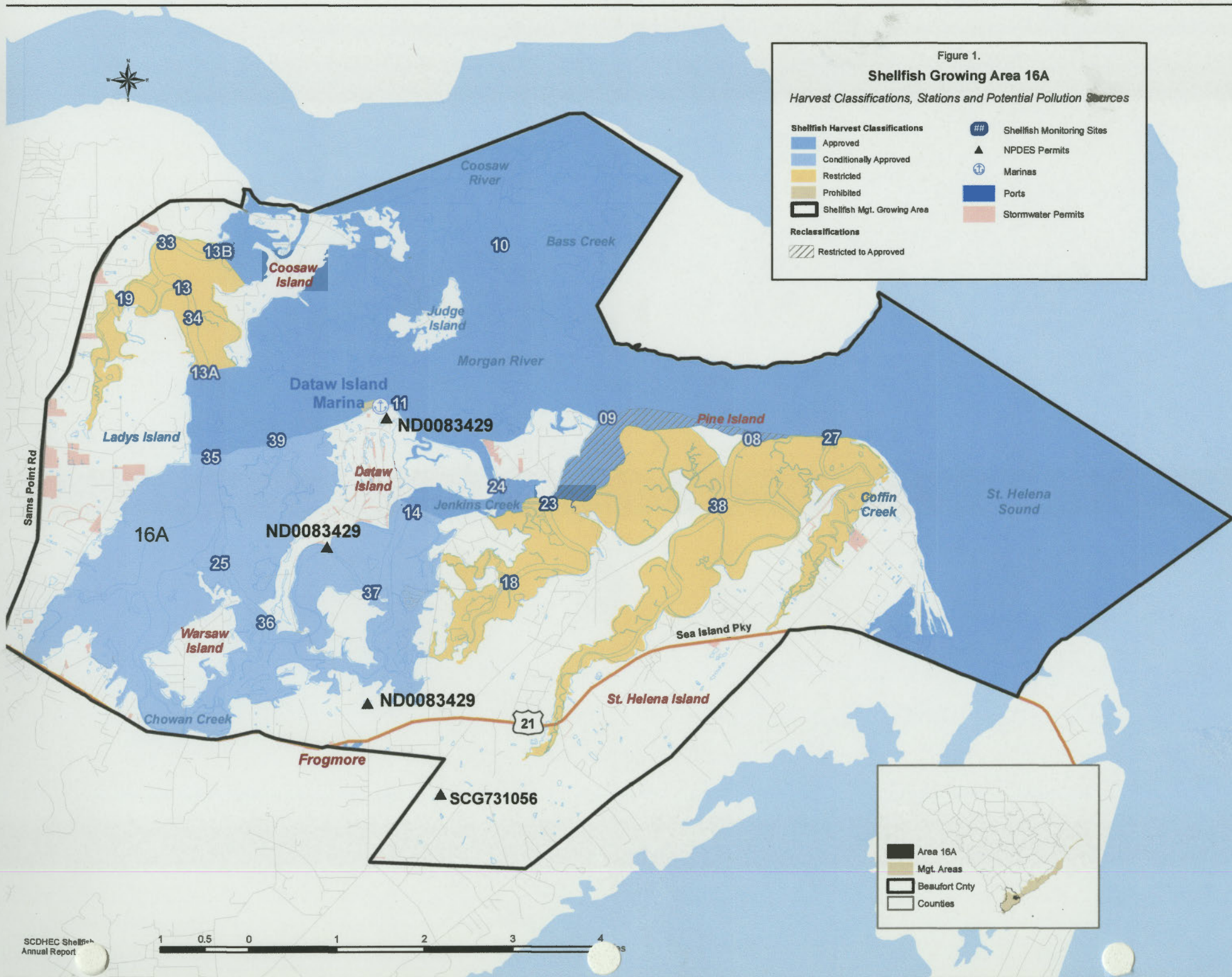
■ Shellfish Mgt. Growing Area

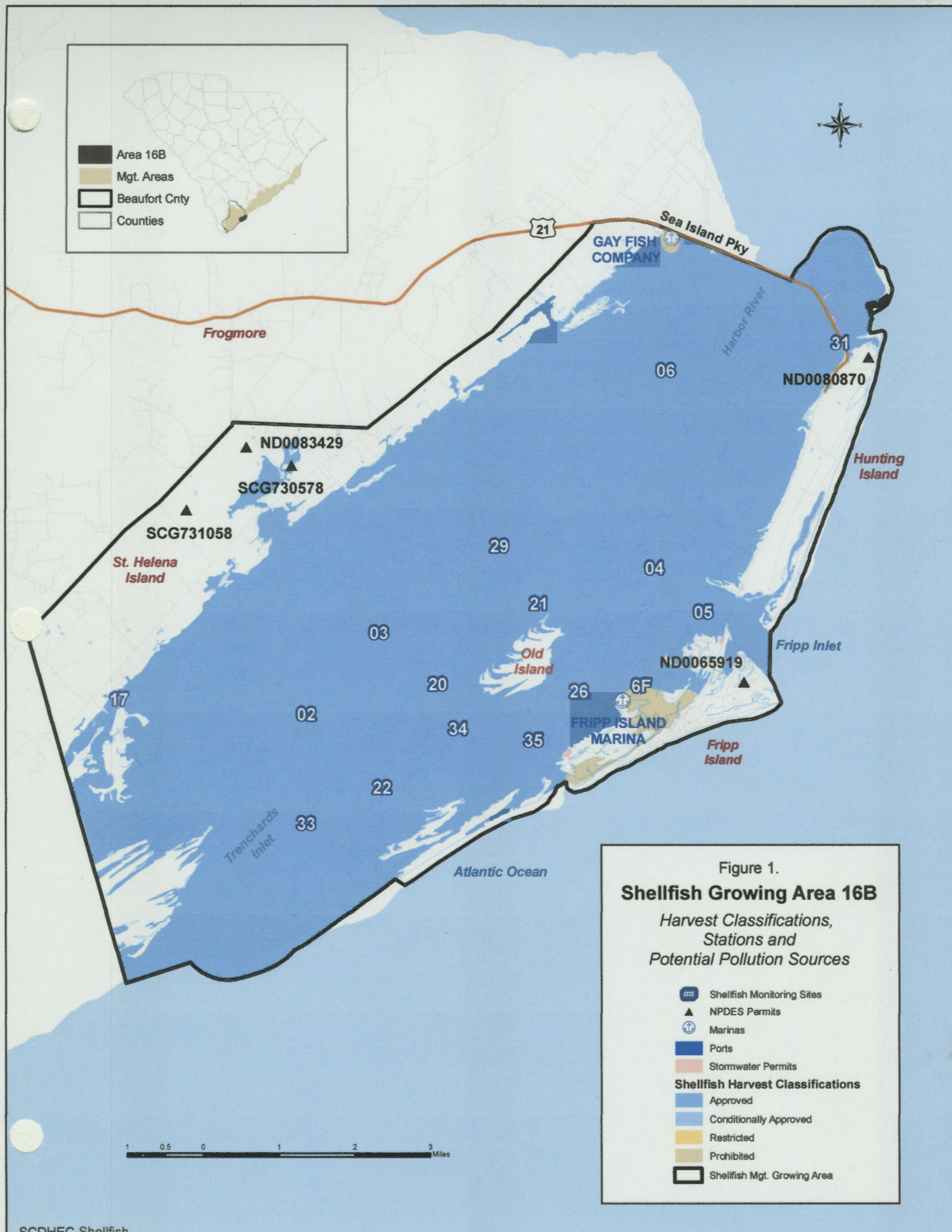
Reclassifications

- ▨ Approved to Restricted
- ▨ Restricted to Approved



1 0.5 0 1 2 3 4 5 Miles





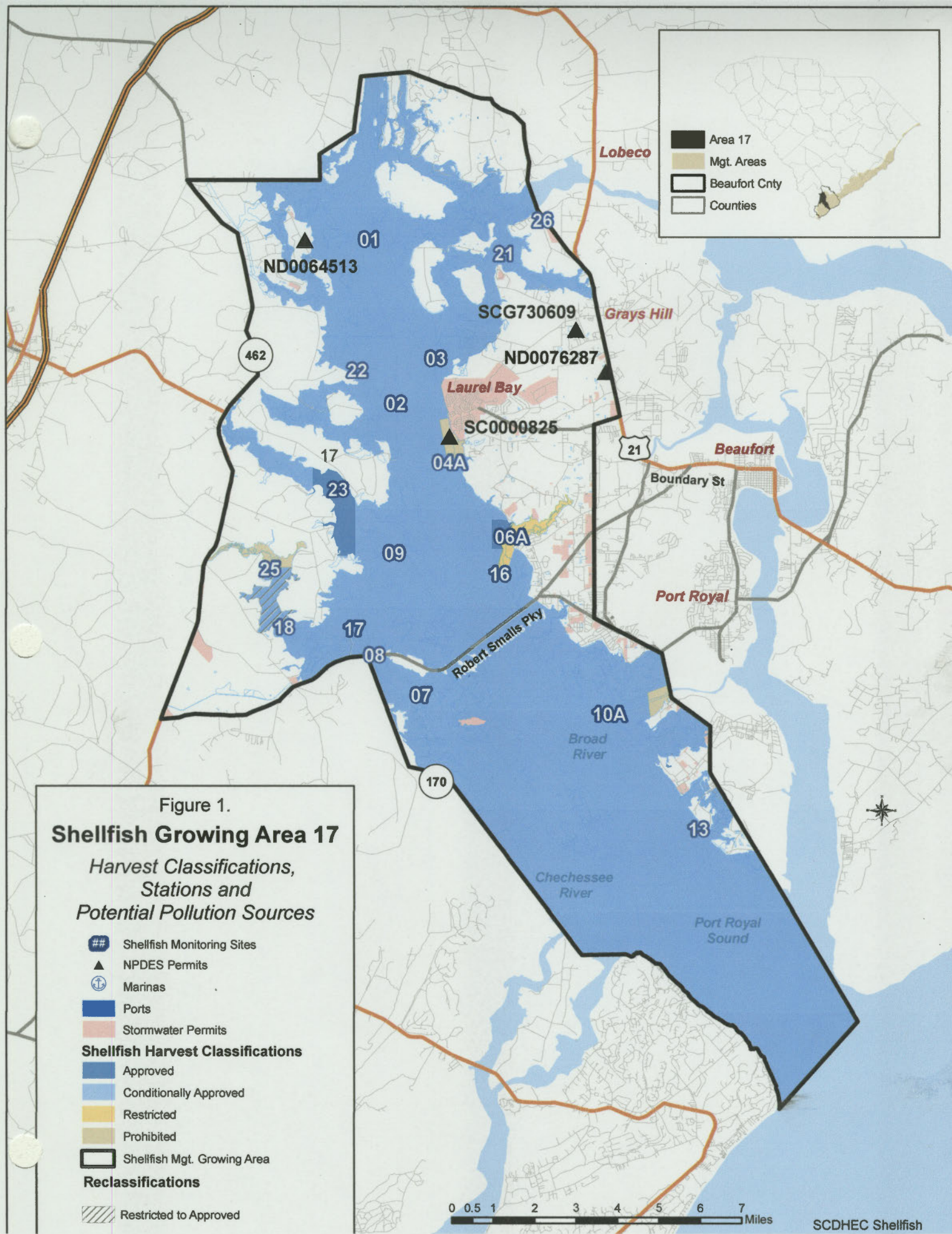


Figure 1.
Shellfish Growing Area 18
*Harvest Classifications,
 Stations and
 Potential Pollution Sources*

- Shellfish Monitoring Sites
- NPDES Permits
- Marinas
- Ports
- Stormwater Permits
- Shellfish Harvest Classifications**
 - Approved
 - Conditionally Approved
 - Restricted
 - Prohibited
- Shellfish Mgt. Growing Area
- Reclassifications**
 - Restricted to Approved

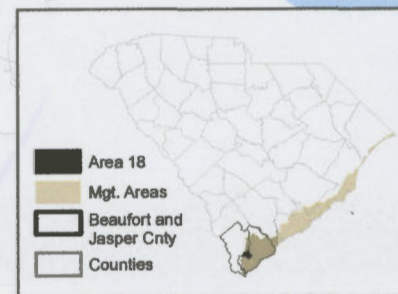
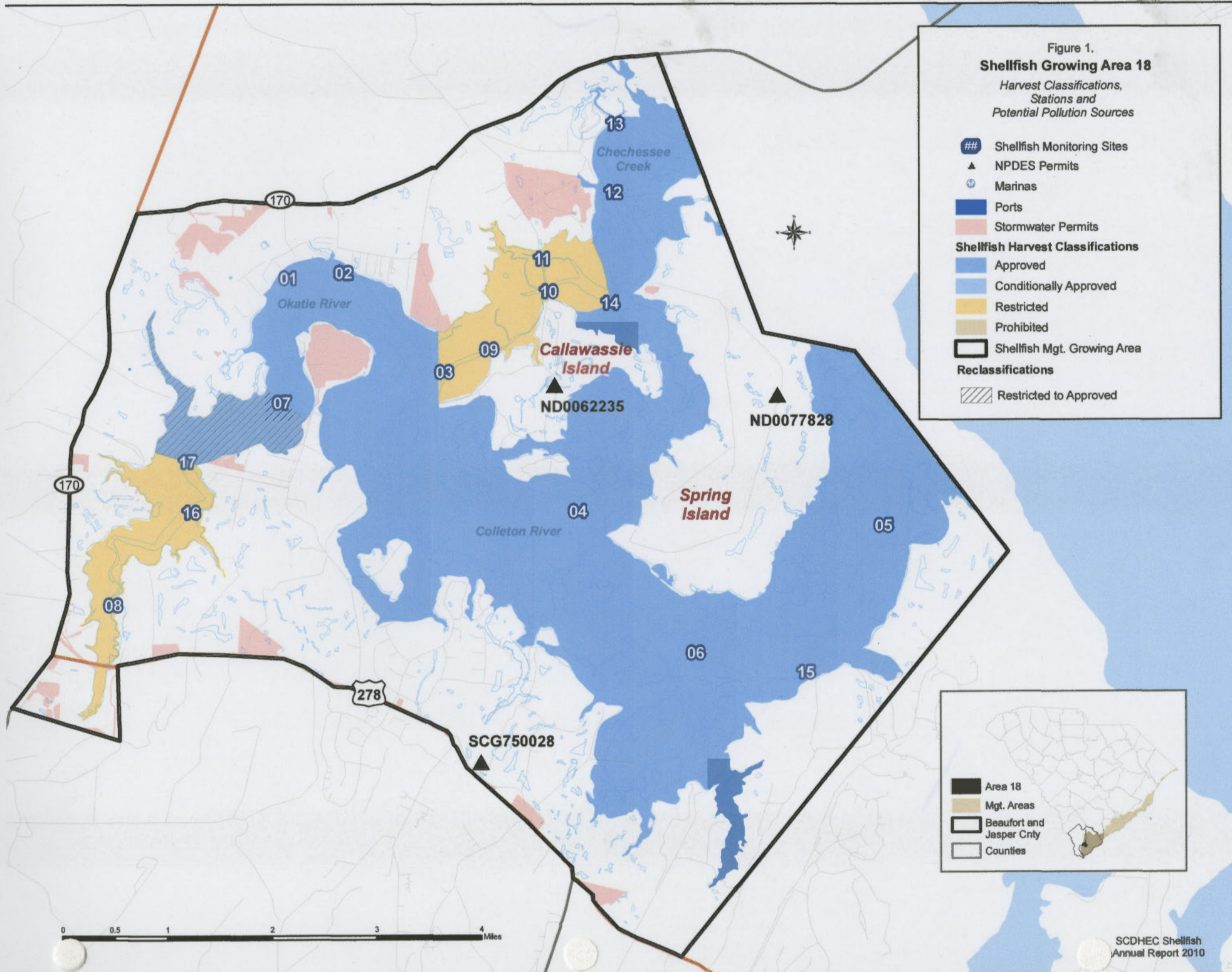


Figure 1.
Shellfish Growing Area 19

*Harvest Classifications,
Stations and
Potential Pollution Sources*

Shellfish Monitoring Sites

▲ NPDES Permits

⚓ Marinas

■ Ports

■ Stormwater Permits

Shellfish Harvest Classifications

■ Approved

■ Conditionally Approved

■ Restricted

■ Prohibited

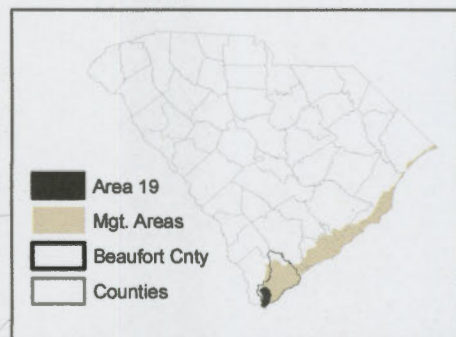
■ Shellfish Mgt. Growing Area

Reclassifications

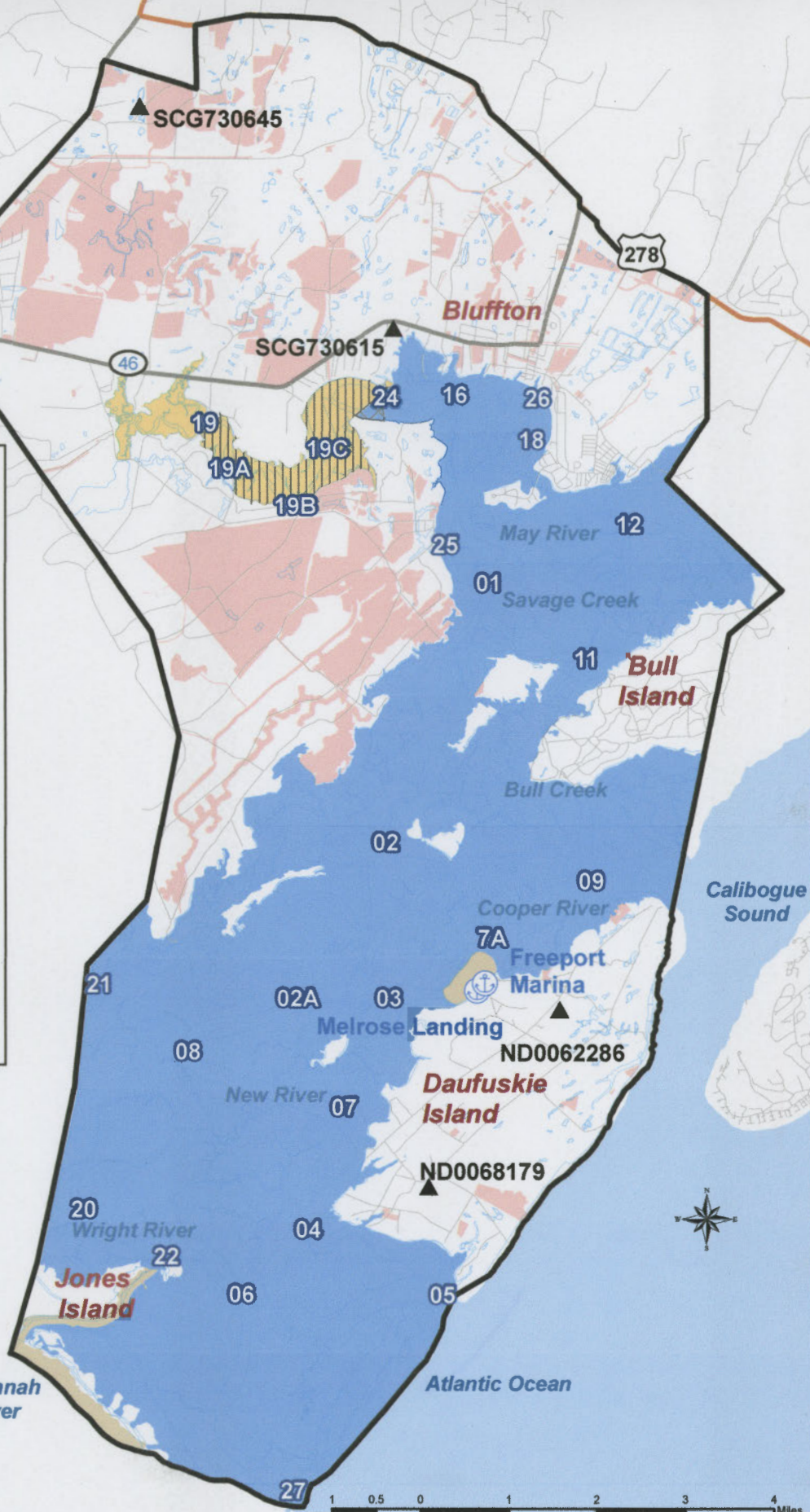
■ Approved to Restricted

■ Conditionally Approved to Approved

■ Conditionally Approved to Restricted



Savannah River



1 0.5 0 1 2 3 4 Miles

Figure 1. Shellfish Growing Area 20

*Harvest Classifications,
Stations and
Potential Pollution Sources*

Shellfish Monitoring Sites

▲ NPDES Permits

⚓ Marinas

Ports

Stormwater Permits

Shellfish Harvest Classifications

Approved

Conditionally Approved

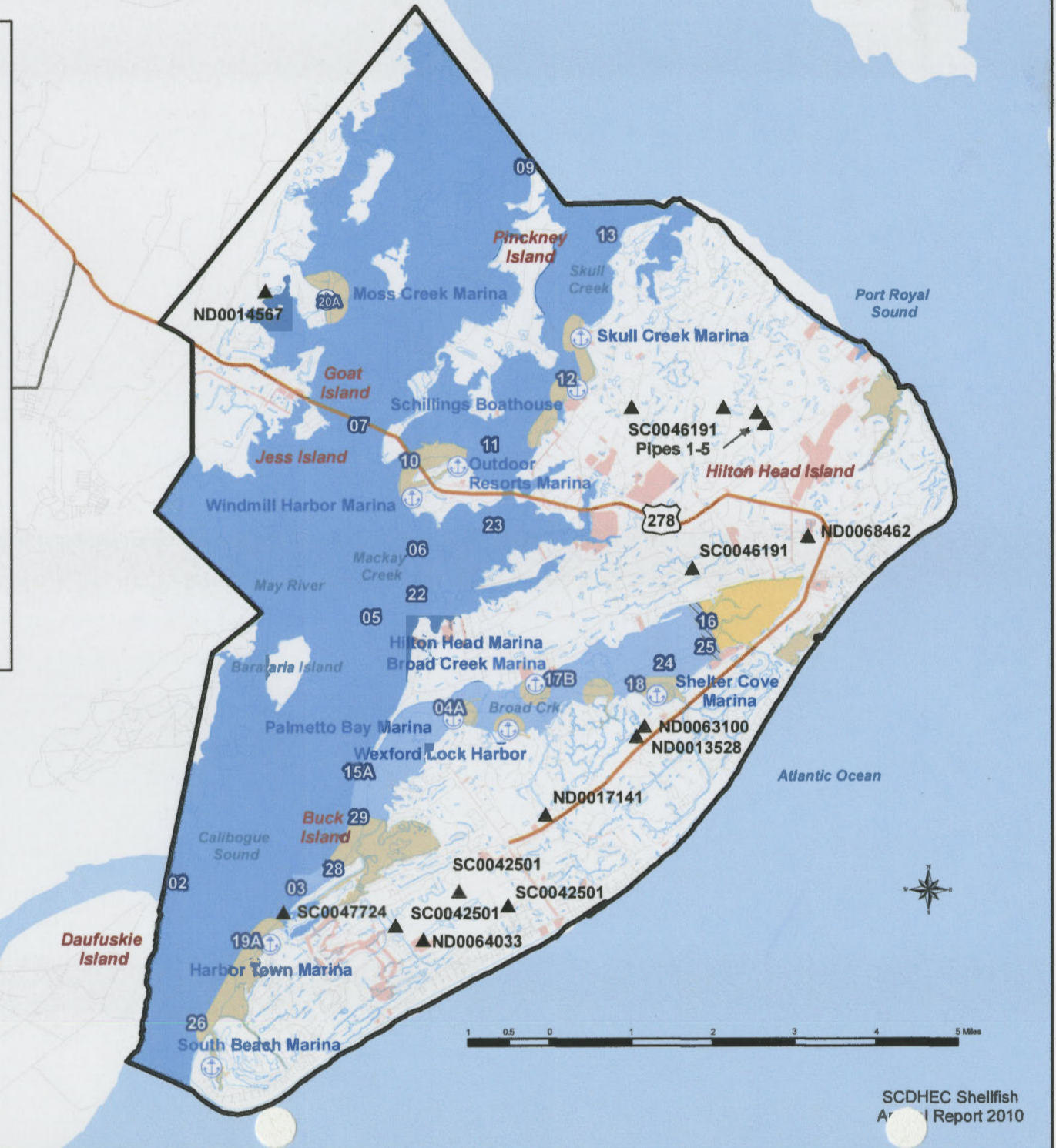
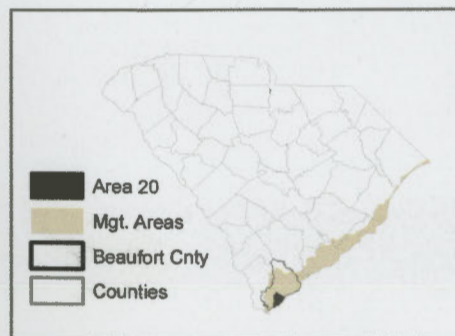
Restricted

Prohibited

Shellfish Mgt. Growing Area

Reclassifications

Restricted to Conditionally Approved



APPENDIX F

COST ANALYSIS FOR SHELLFISH SAMPLES

The following are constants used in the stream run and shellfish calculations:

1. The first sample is collected at 0830 am.
2. For one person collecting the samples, the boat must first be dropped off at the Region 8 office before driving the samples to the Region 7 lab.
3. The mileage from the Region 8 office to the Region 7 lab is 65 miles and the drive takes 1 hour and 21 minutes.
4. It takes 30 minutes to hook up the boat and get gas.
5. It takes 15 minutes to unhook the boat.
6. When 2 people collect the samples, it takes 30 minutes off of the collection time.
7. The two shellfish officers collect the stream and shellfish samples that require a boat. The average per hour salary of the two shellfish officers in Region 8 is \$22.44. This was calculated using their base salary plus 30% to cover benefits. (Memo from Debbie Lybrand – Appendix A).

Below is a detailed example of the calculations used to determine the total cost per run.

The tables that follow show all of the numbers used in the calculations.

Area 14 SF

1 Person collecting and driving samples to Region 7 Lab

2 hr 22 min to collect

30 min to hook up boat/get gas

6 min from landing to Region 8

5 miles

15 min to unhook boat

1 hr 21 min to Region 7 lab

65 miles

4 hr 34 min, arrive at Region 7 lab at 1:04

1 hr 21 min from Region 7 lab to Region 8

65 miles

5 hr 55 min (5.92 hr)

(135 mi)(\$.505/mi) = \$68.18

Staff: $(\$22.44/\text{hr})(5.92 \text{ hr}) = \$132.84 + \$68.18 = \201.02

1 Person collecting and driving samples to Region 8 Lab

2 hr 22 min to collect

30 min to hook up boat/get gas

6 min from landing to Region 8

(5 mi)(\$.505/mi) = \$2.53

2 hr 58 min, arrive at Region 8 lab at 11:28

15 min to unhook boat

3 hr 13 min (3.22 hr)

Staff: $(\$22.44/\text{hr})(3.22 \text{ hr}) = \$72.26 + \$2.53 = \74.79

2 Persons Collecting: P1 drives samples to Region 7; P2 drives boat back to Beaufort

P1: 1 hr 52 min to collect

1 hr 17 min from landing to Region 7 Lab

(62 mi)

3 hr 9 min, arrive at Region 7 lab at 11:39

1 hr 21 min from Region 7 to Region 8

(65 mi)

4 hr 30 min (4.5 hr)

(127 mi)(\$.505/mi) = \$64.14

P1: $(\$22.44/\text{hr})(4.5 \text{ hr}) = \$100.98 + \$64.14 = \165.12

P2: 1 hr 52 min to collect

30 min to hook up boat/get gas

6 min from landing to Region 8

(5 mi)(\$.505/mi) = \$2.53

15 min to unhook boat

2 hr 43 min (2.72 hr)

P2: $(\$22.44/\text{hr})(2.72 \text{ hr}) = \$61.04 + \$2.53 = \63.57

P1 + P2 = $\$165.12 + \$63.57 = \$228.69$

2 Persons collecting and driving samples to Region 8 lab

1 hr 52 min to collect

30 min to hook up boat/get gas

6 min from landing to Region 8 lab

(5 mi)(\$.505/mi) = \$2.53

2 hr 28 min, arrive at Region 8 Lab at 10:58

15 min to unhook boat

2 hr 43 min (2.72 hr)

P1 + P2 = $(\$22.44/\text{hr})(2.72 \text{ hr})(2 \text{ persons}) = \$122.07 + \$2.53 = \124.60

Data for Shellfish Run Calculations

Shellfish Run	Time to collect	Time from landing to Region 8	Mileage from landing to Region 8	Time from landing to Region 7	Mileage from landing to Region 7
Area 13	3 hr, 45 min	1 hr, 18 min	60.4	1 hr, 5 min	46
Area 14	2 hr, 22 min	6 min	5	1 hr 17 min	62
Area 15	3 hr, 26 min	10 min	6	1 hr, 27 min	70
Area 16A	2 hr, 47 min	29 min	14.26	1 hr, 46 min	78
Area 16B	2 hr, 44 min	38 min	20.24	1 hr, 55 min	83.5
Area 17	2 hr, 40 min	15 min	10.84	1 hr, 32 min	74
Area 18	2 hr, 11 min	15 min	10.84	1 hr, 32 min	74
Area 19	2 hr, 59 min	42 min	30.48	2 hr, 10 min	94
Area 20	2 hr, 47 min	42 min	30.48	2 hr, 10 min	94

APPENDIX G

COST ANALYSIS FOR BEACH SAMPLES

Hilton Head Beach

There are 14 sample sites and the average time to collect is 3.5 hours.

- Drive time from Hilton Head to Region 7 lab is 2.1 hours

Collection time + drive time = 5.6 hours. This is too close to the 6 hour limit that the samples must arrive in the lab to be feasible.

- Drive time from Hilton Head to Region 8 lab is 0.7 hours

Collection time + drive time = 4.2 hours

Cost: $(4.2 \text{ hr})(\$35.13/\text{hr}) + (0.7 \text{ hr})(\$505/\text{hr}) = \$162.95$ (10 times/yr) = \$1629.50/yr

The rec waters manager collects the beach samples. His base salary plus 30% is \$35.13.

Fripp Island, Hunting Island and Harbor Island Beach

There are 14 sample sites and the average time to collect is 3.5 hours.

- Drive time from Harbor Island to Region 7 lab is 2.02 hours

Collection time + drive time = 5.52 hours. This is too close to the 6 hour limit that the samples must arrive in the lab to be feasible.

- Drive time from Fripp Island to Region 8 lab is 0.8 hours

Collection time + drive time = 4.3 hours

Cost: $(4.3 \text{ hr})(\$35.13/\text{hr}) + (0.8 \text{ hr})(\$505/\text{hr}) = \$165.38$ (10 times/yr) = \$1653.80

Edisto Beach

There are 14 sample sites and the average time to collect is 1.75 hours.

- Drive time from Edisto Beach to Region 7 lab is 1.08 hours (46 miles)
- Drive time from Edisto Beach to Region 8 lab is 1.3 hours (60.4 miles)
- Drive time from the Region 7 lab to the Region 8 lab is 1.35 hours (65 miles)

- Collection time + drive time = 2.83 hours. These samples could get to the Region 7 lab within the required 6 hours.

The cost to drive the samples to the Region 7 lab would be:

$$(1.75 \text{ hrs} + 1.08 \text{ hrs} + .35 \text{ hrs})(\$35.13) + (46 \text{ miles} + 65 \text{ miles})(\$.505/\text{mile}) = \\ \$202.84(10 \text{ times}/\text{yr}) = \$ 2028.40/\text{yr}$$

The cost to drive the samples to the Region 8 lab would be:

$$(1.75 \text{ hrs} + 1.3 \text{ hrs})(\$35.13/\text{hr}) + (60.4 \text{ miles})(\$.505/\text{mile}) = \$137.65(10 \text{ times}/\text{yr}) = \\ \$1376.50/\text{yr}$$

APPENDIX H

COST ANALYSIS FOR DRINKING WATER SAMPLES

The following are constants used in the drinking water calculations:

All 13 of the public drinking water routes are collected during the first quarter.

There are an average of 18 samples per route.

The average weight of the samples + cooler = 16 lbs.

The average weight of the empty cooler is 13 lbs.

The state courier charges \$1.25/lb for samples and \$.60 for non-samples.

There are an average of 8 samples per month from private citizens.

The average weight of the samples + cooler = 6 lbs.

The average weight of the empty cooler is 5 lb.

The cost to courier the samples to the Columbia lab is the sum of the cost to get the samples back to the Region 8 office and the cost to ship the samples :

$$(16 \text{ lb/route})(13 \text{ routes})(\$1.25/\text{lb}) + (6 \text{ lb/private})(8 \text{ private/month})(3 \text{ months})(\$1.25/\text{lb}) \\ = \$440.$$

The cost to ship the coolers back is:

$$(13 \text{ lbs/cooler})(13 \text{ coolers})(\$1.25/\text{lb}) + (5 \text{ lb/cooler})(8 \text{ coolers})(\$1.25/\text{lb}) = \$124.$$

The total cost for quarter one is $\$440 + \$124 = \$564$.

For quarters 2-4, there are an average of 42 public drinking water samples collected in 5 separate routes per month. The average weight of the coolers plus samples is 10 lbs. The average weight of the empty coolers is 5 lbs. The number of private samples is the same for all quarters.

The cost to courier the samples to the Columbia lab is:

$$(10 \text{ lb/route})(5 \text{ routes/month})(3 \text{ months})(\$1.25/\text{lb}) = \$187.50.$$

The cost to ship the empty coolers back is:

$$(5 \text{ lb/cooler})(5 \text{ coolers/month})(3 \text{ months})(\$.60/\text{lb}) = \$45.$$

The total cost for quarters 2 – 4 is $\$187.50 + \$45 + \$180 + \$124 = \$536.50$.

The total cost for the year to courier the drinking water samples to the Columbia lab is

$$\$564 + \$536.50 + \$4385.88 = \$5486.38.$$

Below is a detailed example of the calculations used to determine the cost per run to drive the samples to the Region 7 lab and to the Region 8 lab. The table that follows shows all of the numbers used in the calculations.

Beaufort 1

Drive the samples to the Region 7 lab

2 hr 48 min to collect

1 hr 27 min to Region 7

(70 miles)

1 hr 21 min from Region 7 to Region 8

(65 miles)

5 hr, 36 min (5.6 hr)

(135 miles)(\\$.505/mile) = \$68.18

$$\text{Cost: } (5.6 \text{ hr})(\$19.67/\text{hr}) + \$68.18 = \$178.33$$

Drive the samples to the Region 8 lab

2 hr 48 min to collect

10 min to Region 8

(6 miles)(\\$.505/mile) = \$3.03

2 hr 58 min (2.97 hr)

$$\text{Cost: } (2.97 \text{ hr})(\$19.67/\text{hr}) + \$3.03 = \$61.45$$

Data for Drinking Water Calculations

Water Route	Time to Collect	Time to Region 8	Miles to Region 8	Time to Region 7	Miles to Region 7
Beaufort 1	2 hr, 48 min	10 min	6	1 hr, 27 min	70
Beaufort 2	2 hr, 38 min	8 min	4	1 hr, 17 min	62
3&7 (x)	2 hr, 25 min	44 min	38	1 hr, 4 min	49
3&7 (y)	2 hr, 25 min	44 min	38	1 hr, 4 min	49
3&7 (z)	2 hr, 25 min	44 min	38	1 hr, 4 min	49
4A	2 hr, 51 min	42 min	31	1 hr, 30 min	76
4B	2 hr, 37 min	29 min	26	1 hr, 16 min	60
5	3 hr, 31 min	42 min	30.5	2 hr, 10 min	94
6	3 hr, 4 min	38 min	29	1 hr, 43 min	90.3
8	2 hr, 3 min	49 min	38.1	42 min	32
9	3 hr, 31 min	42 min	30.5	2 hr, 10 min	94
10A	3 hr, 6 min	1 hr, 7 min	49	1 hr, 45 min	78.4
10B	3 hr, 6 min	1 hr, 7 min	49	1 hr, 45 min	78.4

APPENDIX I
TOTAL COSTS PER YEAR

Ship Shellfish and Drinking Water Samples to Columbia Lab

Hire 2 Manager I's: $(\$40,929/\text{yr})(2) = \$81,858$ (Appendix A)

Shellfish: Cost to collect and get to Region 8 + cost to ship the samples

$(\$920.31/\text{month})(12 \text{ months})$ (Table II, pg 7)

$+ 12[(9 \text{ runs})(42 \text{ lb/run})(\$1.25/\text{lb}) + (9 \text{ empty coolers})(15 \text{ lb/cooler})(\$0.60/\text{lb}) =$

$\$17,685.72/\text{yr}.$

Drinking Water: Cost to collect and get to Region 8 + cost to ship the samples

$\$5486.38/\text{yr}$ (Appendix G)

Total: $\$81,858 + \$17,685.72 + \$5486.38 = \$105,030.10/\text{yr}$

$+ \text{cost of analyzing remaining samples in Region 8 lab} =$

$\$8991.60$ (streams, Table I, pg 4) $+ \$4659.80$ (beaches, Appendix G) $+$

$\$20,464.50$ (1/2 of an FTE to analyze samples, Appendix A) $= \$34,115.90$

Grand Total: $\$105,030.10 + \$34,115.90 = \$139,146.00/\text{yr}$

- Drinking water sampling limited to Mondays
- Shellfish sampling limited to Monday-Wednesday
- Columbia lab not FDA certified
- Need more space for equipment
- Beach and stream samples must be analyzed in Region 8 because of the holding time limits. Have to maintain staff and equipment to analyse these samples.

-

Drive collected samples to the Region 7 lab for analysis

Streams: Would require 2 persons to collect in order to get the samples to the lab by 1:30.

Six months of the year, collect all 9 stream runs. The other six months, collect only 6 of the 9 runs.

$$(6)(\$2,498.85) + (6)(\$1657.28) = \$24,909.78/\text{yr} \quad (\text{Table I, pg 4})$$

$$\text{Shellfish: } (12)(\$1973.73) = \$23,684.76/\text{yr} \quad (\text{Table II, pg 7})$$

$$\text{Drinking Water: } (4 \text{ quarters})(\$2,307.72/\text{quarter}) = \$9230.88/\text{yr} \quad (\text{Table III, pg 10})$$

$$\text{Edisto Beach: } (10 \text{ runs/yr})(\$202.84/\text{run}) = \$2028.40/\text{yr} \quad (\text{Appendix G})$$

Total: \$59,853.82/yr

+ cost of analyzing Hilton Head, Fripp, Hunting and Harbor Island beach samples in Region 8 lab = \$1,629.50/yr + \$1,653.80/yr (Appendix G) + \$13,643/yr (1/3 of an FTE to analyze these samples, Appendix A) = \$16,926.30/yr

+ cost of maintaining 3 full time lab staff in Region 7 (\$154,056.50/yr. – personnel cost of current lab staff).

$$\text{Grand Total: } \$59,853.82/\text{yr} + \$16,926.30/\text{yr} + \$154,056.50/\text{yr} = \$230,839.62/\text{yr}$$

-Staff spending time driving to and from Region 7 lab cannot complete other required patrols, inspections, complaints and data entry.

- Hilton Head and Fripp, Harbor and Hunting Island beach samples must be analyzed in Region 8 because of the holding time limits. Have to maintain staff and equipment to analyze these samples.

Drive collected samples to the Region 8 lab for analysis

Streams: \$8,991.60/yr (Table I, pg 4)

Shellfish: \$11,043.72/yr (Table II, pg 7)

Drinking Water: \$4,385.88/yr (Table III, pg 10)

Beaches: \$4,659.80/yr (Appendix G)

Total: \$29,081.00/yr

+ \$40,929.00/yr to hire Manager I to run the lab
\$70,010.00/yr

Building Costs

10,270 square feet at \$16.88 per square foot = \$173,357.60/yr

Office space is 8,502 square feet = \$143,513.76/yr

Lab space is 1768 square feet = \$29,843.84/yr

It would cost \$230,839.62/yr to drive the samples to the Region 7 lab. The cost of the lab space in Region 8 plus the cost of operating the lab is \$99,853.84/yr. This is considerably less than the cost to drive the samples to the Region 7 lab and less than the cost to ship the samples to the Columbia lab.

If the Region 8 lab is kept fully functional, a Manager I could replace the current two Region 7 lab staff upon retirement. The personnel cost for the Region 7 lab then becomes \$99,201.50/yr. The cost to keep both labs fully functional is \$99,853.84/yr (Region 8) + \$99,201.50/yr (Region 7) = \$199,055.34/yr. This is less than the \$230,839.62/yr to drive the samples to the Region 7 lab.

APPENDIX J

COMMERCIAL PROPERTIES FOR LEASE

Showcase Your Properties Here!

[Home](#) [New Search](#)Search Results for **2212 Mossy Oaks Road, Port Royal, SC**

Welcome to SHOWCASE.COM, the Web's most comprehensive source of commercial property data, where you can search from 900,000 listings nationwide. To see more Commercial Real Estate listings, Office Space, Industrial Space, Retail Space, Commercial Land, Multi-Family or other commercial property types, just click the button to the right.

[New Search](#)[Detail](#)[Map](#)[Forward to a Colleague](#)[Print Property](#)**2212 Mossy Oaks Road**

Port Royal, SC 29935-1041

Property Type: Office
Status: Existing
Sub Type: -
Year Built: 1999
For Sale Price: \$780,000
Price/SF: \$153.42
Cap Rate: -
Stories: 1
Typical Floor: 5,084 SF
Building Size: 5,084 SF
Smallest Space: 5,084 SF
Largest Space: 5,084 SF
Total Space Avail: 5,084 SF
Rent/SF/Yr: \$9.00

Parking: Free Surface spaces are available**Space Available:**

Floor	SF Avail	Rent	Occupancy	Lease Term	Space Use
1st	5,084 SF	\$9.00/SF/Yr	60 Days	2-5 yrs	Office
Suite: ENT Available: 5,084 SF of Office, will not divide Largest Space: 5,084 SF Rent/SF/Yr: \$9.00 / nnn Rent/Yr: \$45,756 Exec Suite: No Occupancy: 60 Days Type: Direct Term: 2-5 yrs					



For more information:
Coldwell Banker Commercial Platinum Partners
Billy Keyserling (843) 592-0400

Coldwell Banker Platinum Partners
Richard Tritschler (843) 986-2444

**For Sale Contacts****Coldwell Banker Commercial Platinum Partners**

Billy Keyserling
 (843) 592-0400

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Richard Tritschler
 (843) 986-2444

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	100% Leased Retail Center near Downtown Beaufort Beaufort, South Carolina Recently renovated retail center approximately 1 mile from historic downtown Beaufort, SC. Tenants include Carolina Title, Resource Medical and...	Status: Active Price: \$850,000 GLA: 8,800 SF Cap Rate: 8.75% Primary Type: Shopping Center Sub-Type: Strip Center
	Hudson Tract Beaufort, South Carolina HudsonTract with 58 prime acres on Highway 21 (Trask Pkwy) is ready for development. Zoned as part of the Seabrook-Stuart Point Community...	Status: Active Price: \$1,900,000 Lot Size: 1.00 - 800.00 Acres Primary Type: Land Sub-Type: Commercial/Other (land)
	Graybar Building Beaufort, South Carolina Prime Commercial Space on the highly traveled Highway 170 at the entrance to Historic Beaufort. This highly visible 7,000 sq/ft metal on frame...	Status: Active Price: \$695,000 Bldg. Size: 7,000 SF Cap Rate: N/A Primary Type: Retail Sub-Type: Free Standing Bldg
	SWaterfront Restaurant Beaufort, South Carolina Covered deck seats 50-60. Total inside seating for 100-110 more. Beautiful 100 yr old bldg structurally sound, but cosmetic work needs to be done...	Status: Active No. Spaces: 1 Rental Rate: \$20.00 Space Available: 5,000 SF Bldg. Size: 5,000 SF Primary Type: Retail Sub-Type: Restaurant
	Lipsitz Beaufort, South Carolina The Lipsitz building has overlooked Bay Street in the City of Beaufort's Historic central business district for over 100 years. This 11,000+...	Status: Active Price: \$1,200,000 Bldg. Size: 11,000 SF Cap Rate: N/A Primary Type: Retail Sub-Type: Free Standing Bldg
	Palmetto Antique Gallery Beaufort, South Carolina 4 Retail Buildings - The larger Building is The Antique Gallery 3 other smaller buildings, Asian Foods, one is a Consignment Furniture Store.	Status: Active Price: \$790,000 Bldg. Size: 9,000 SF Cap Rate: N/A Primary Type: Retail Sub-Type: Retail (Other)
	Land Beaufort, South Carolina Developer's Dream. Wood Lot with approximately 300 Feet of Deep Water Frontage. Lot Size approximately 9.4 Acres	Status: Active Price: \$1,900,000 Lot Size: 9.40 Acres Primary Type: Land Sub-Type: Multifamily (land)
	Applebee's Beaufort, South Carolina The tenant, Apple-J, LP, signed a 20-year NNN Lease that commenced rent on June 28, 2004. The Lease contains four (4), five (5) year options to...	Status: Active Price: \$2,900,000 Bldg. Size: 5,003 SF Cap Rate: 8.53% Primary Type: Retail Sub-Type: Free Standing Bldg
	BURLINGTON PLANTATION Beaufort, South Carolina 660 acres of prime development land on the Broad River in beautiful Beaufort, SC. This parcel is ideal for a masterplanned waterfront and golf...	Status: Active Price: Not Disclosed Lot Size: 660.00 Acres Primary Type: Land Sub-Type: Residential (land)
	Midtown Village Beaufort, South Carolina Anchor Tenant: Bi-Lo. Neighboring tenants include: Dollar Store, H&R Block, and Citi Financial. 2010 median household income within a 1 mile...	Status: Active No. Spaces: 1 Rental Rate: \$16.00 Space Available: 1,500 SF GLA: 68,324 SF Primary Type: Shopping Center Sub-Type: Community Center
	SALEM VILLAGE Beaufort, South Carolina Available for sale or lease is Salem Village, a 33,735 square foot shopping center located in the heart of Beaufort, SC. The entire shopping...	Status: Active No. Spaces: 4 Rental Rate: Negotiable Space Available: 1,545 - 17,225 SF Bldg. Size: 33,735 SF Primary Type: Retail Sub-Type: Retail (Other)
	BEAUFORT COMMERCE PARK Beaufort, South Carolina Beaufort Commerce Park is Beaufort County's premier location for industry. Comprised of 175 high acres of subdivided, light to moderate...	Status: Active Price: \$170,100 - \$372,800 Lot Size: 3.78 - 9.32 Acres Primary Type: Land Sub-Type: Industrial (land)
	Land Beaufort, South Carolina 0.98 acres of vacant land zoned Commercial. Ready to be cleared and developed.	Status: Active Price: \$260,000 Lot Size: N/A Primary Type: Land Sub-Type: Commercial/Other (land)
Robert Smalls Parkway Beaufort, South Carolina		Status: Active Price: \$5,900,000

	12 Acres, Prime Location on SC Highway 170 (Robert Smalls Parkway) in Beaufort, SC	Lot Size: 12.00 Acres Primary Type: Land Sub-Type: Commercial/Other (land)
	1001 Bay Street Beaufort, South Carolina The George Parsons Elliott House, circa 1840, one of Beaufort's most visible architectural treasures overlooking the downtown marina. Renovated...	Status: Active Price: \$1,395,000 Bldg. Size: 7,920 SF Cap Rate: N/A Primary Type: Retail Sub-Type: Retail (Other)
	220 Robert Smalls Parkway Beaufort, South Carolina Located across from Lowes and next to Zaxby's. The curb cut is in place as is the shared retention pond. Great possibility and ready to be built on...	Status: Active Price: \$749,000 Lot Size: 1.38 Acres Primary Type: Land Sub-Type: Commercial/Other (land)
	Hamrick & Broad River Beaufort, South Carolina 15+ acres available in Beaufort. Access from both Broad River Drive and Shell Point Park. This property is zoned GR Town of Port Royal. It is...	Status: Active Price: \$1,500,000 Lot Size: 15.07 Acres Primary Type: Land Sub-Type: Commercial/Other (land)
	Waterfront Compound Beaufort, South Carolina PROPERTY HAS JUST BEEN REDUCED TO \$1,000,000 FROM \$1,800,000. 4 acres, with 500 ft of waterfront on Harbor River zoned...	Status: Active Price: \$1,000,000 Lot Size: 4.00 Acres Primary Type: Land Sub-Type: Residential (land)
	74 Jennings Road Beaufort, South Carolina Apartment development	Status: Active Price: \$1,500,000 Lot Size: 10.00 Acres Primary Type: Land Sub-Type: Multifamily (land)
	Former Kmart Tire and Battery Space Beaufort, South Carolina Former tire and battery space for Sub-Lease. Well positioned in Beaufort. Lease rate is valid for the remainder of Kmart's lease term.	Status: Active No. Spaces: 1 Rental Rate: \$5.00 Space Available: 4,580 SF Bldg. Size: 250,000 SF Primary Type: Retail Sub-Type: Vehicle Related
	128 Seabrook Rd Beaufort, South Carolina Prime development property with deep water, tidal access and marsh views. This 37 acre tract has direct access to all utilities and is minutes...	Status: Active Price: \$3,500,000 Lot Size: 37.00 Acres Primary Type: Land Sub-Type: Residential (land)
	104 Parker Dr. Beaufort, South Carolina 32,724 square foot warehouse containing 10,270 square feet of office space. 22,454 sf of warehouse available currently that contains...	Status: Active No. Spaces: 1 Rental Rate: \$5.00 Space Available: 22,454 SF Bldg. Size: 32,724 SF Primary Type: Industrial Sub-Type: Warehouse
	Beaufort Industrial Village Beaufort, South Carolina PROPERTY: Burton Hill Business Park is a Limited Industrial park within the City of Beaufort. It is a 32-acre park with 10 sites available...	Status: Active Price: \$275,625 Bldg. Size: 2,000 SF Cap Rate: N/A Primary Type: Industrial Sub-Type: Industrial-Business Park
	Beaufort Industrial Village Beaufort, South Carolina PROPERTY: Burton Hill Business Park is a Limited Industrial park within the City of Beaufort. It is a 32-acre park with 10 sites available...	Status: Active Price: \$162,750 Bldg. Size: 2,000 SF Cap Rate: N/A Primary Type: Industrial Sub-Type: Industrial-Business Park
	700 BAY STREET Beaufort, South Carolina Sperry Van Ness is pleased to present beautiful, Class A commercial space for lease in the heart of downtown Beaufort. Preserving its historic...	Status: Active No. Spaces: 3 Rental Rate: \$22.00 Space Available: 2,086 - 11,654 SF Bldg. Size: 14,425 SF Primary Type: Retail Sub-Type: Retail (Other)

→ current space

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Hwy 17
20,000 SF
 Hardeeville, SC 29927
 20,000 SF Industrial Building
 20,000 SF Avail
 For Lease



Hwy 17
500,240 SF
 Hardeeville, SC 29927
 500,240 SF Industrial Building
 500,240 SF Avail
 For Lease



14 Schinger Ave
 Ridgeland, SC 29936
 1,200 SF Retail Building
 1,200 SF Avail
 For Lease



857 James L. Taylor Rd
 Ridgeland, SC 29936
 4,213 SF Retail Building
 For Sale



Hwy 17
210,000 SF
 Hardeeville, SC 29927
 210,000 SF Industrial Building
 210,000 SF Avail
 For Lease



Hwy 17
161,250 SF
 Hardeeville, SC 29927
 161,250 SF Industrial Building
 161,250 SF Avail
 For Lease



Hwy 17
500,240 SF
 Hardeeville, SC 29927
 500,240 SF Industrial Building
 500,240 SF Avail
 For Lease



300 New River Pky
 Hardeeville, SC 29927
 2,290 SF Office Building
 2,290 SF Avail
 For Lease



175 Hardeeville Industrial Park Rd
 Hardeeville, SC 29927
 12,750 SF Industrial Building
 12,750 SF Avail
 For Lease and For Sale



Hwy 17
500,240 SF
 Hardeeville, SC 29927
 500,240 SF Industrial Building
 500,240 SF Avail
 For Lease

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[New Search](#)[Detail](#)[Map](#)[Forward to a Colleague](#)[Print Property](#)**400 Sniders Highway**

Walterboro, SC 29488

Property Type: Office
Status: Existing
Stories: -
Typical Floor: 1,560 SF
Building Size: 1,728 SF

Sub Type: -
Year Built: -
For Sale Price: \$195,000
Price/SF: \$112.85
Cap Rate: -
Smallest Space: 1,728 SF
Largest Space: 1,728 SF
Total Space Avail: 1,728 SF
Rent/SF/Yr: \$12.00

Space Available:

Floor	SF Avail	Rent	Occupancy	Lease Term	Space Use
1st	1,728 SF	\$12.00/SF/Yr	Vacant	1-3 yrs	Office
Available: 1,728 SF of Office, will not divide Largest Space: 1,728 SF Rent/SF/Yr: \$12.00 / nnn Rent/Yr: \$20,736 Exec Suite: No Occupancy: Vacant Type: Direct Term: 1-3 yrs For more information: Carolina One Roger W Sample ☎ (843) 958-9948 ✉ Kip Bowman (843) 556-5800 ✉					



For Sale Contacts



Carolina One

 Roger W Sample
 (843) 958-9948
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For Lease Contacts



Carolina One

 Roger W Sample
 (843) 958-9948
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APN: 178-08-00-046

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[New Search](#)[Detail](#)[Map](#)[Forward to a Colleague](#)[Print Property](#)**340 Technology Drive**

Walterboro, SC 29488

Property Type:	Industrial	Sub Type:	Warehouse
Status:	Existing	Year Built:	-
Building Size:	31,250 SF	Ceiling Height:	-
Land Area:	33 AC (1,437,480 SF)	Loading Docks:	-
		Rail:	-
		Power:	-
Smallest Space:	31,250 SF	Zoning:	-
Largest Space:	31,250 SF	Sprinklers:	-
Total Space Avail:	31,250 SF	Drive Ins:	4 tot.
Rent/SF/Yr:	Negotiable	Cranes:	-

**For Lease Contacts****Star Construction & Leasing**

Lamar Penick
(912) 665-1328

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Space Available:

Floor	SF Avail	Rent	Occupancy	Lease Term	Space Use
1st	31,250 SF	Negotiable	Vacant	Negotiable	Warehouse
Available: 31,250 SF of Warehouse, will not divide Largest Space: 31,250 SF Rent/SF/Yr: Negotiable Rent/Yr: Negotiable Exec Suite: No Occupancy: Vacant Type: Direct Term: Negotiable					
For more information: Star Construction & Leasing Lamar Penick (912) 665-1328					

APN: 132-00-00-222

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Featured Properties Hampton, SC



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Georgia Pacific Industrial Land
Hampton, SC 29924
11 Acres of Land
For Sale



407 E Elm St
Hampton, SC 29924
.46 Acres of Land
For Sale

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Location
Hampton, SC

[Search on a Map](#)

Property
Type

☐ Office ☐ Multi-Family
☐ Industrial ☐ Land
☐ Retail ☐ Other

☒ Lease

☐ Buy

Space Available (SF)

min size to max size

Rent - Per SF (\$ Per Year) ☐

min rent to max rent

Building Size (SF)

min size to max size

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Featured Properties Yemassee, SC

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FREE PROPERTY SEARCH

Location
Yemassee, SC

[Search on a Map](#)

Property
Type

☐ Office ☐ Multi-Family
☐ Industrial ☐ Land
☐ Retail ☐ Other

☒ Lease

☐ Buy

Space Available (SF)

min size to max size

Rent - Per SF (\$ Per Year) ☒

min rent to max rent

Building Size (SF)

min size to max size

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APPENDIX K

POSITION DESCRIPTIONS FOR SHELLFISH PERSONNEL

STATE OF SOUTH CAROLINA POSITION DESCRIPTION

1. Job Purpose:

Under limited supervision of the Emergency Response Coordinator, establish and manage a non-point source program, and the shellfish program for Region 8 – Beaufort EQC.

2. Job Functions:

1. Supervise two Law Enforcement Officers to meet the goals of the non-point source, surface water quality monitoring, and shellfish sanitation program for Region 8 – Beaufort EQC. Assist as needed with the beach-monitoring program.
2. Supervise one surface water quality person to identify and reduce impacts on surface water quality. Attend municipal, county, and agency planning committee meetings on surface water quality issues. Coordinate regional activities in developing watershed planning, monitoring, and plan implementation efforts.
3. Establish & implement a shoreline survey to identify & eliminate possible sources of non-point source pollution that have an adverse impact on shellfish harvesting areas.
4. Establish & implement a law enforcement effort to ensure that shellfish sanitation regulations are adequately enforced and to assist in other program areas as needed.
5. Ensures that Sanitary Surveys are prepared to document sources of point source and non-point source pollution and the impact on classifications of Shellfish Harvesting Areas.
6. Establishes and implements a shellfish plant inspection program as required by the Shellfish Sanitation Program.
7. Ensures that citizen complaints and inquiries are responded to properly. Provides technical assistance to the regulated community.
8. Participates as a member of the Region 8 Emergency Response Team, responsible for ensuring clean up of spills of oil and hazardous materials. Responds to fish kills.
9. Attends and testifies at administrative and court hearings as needed.
10. Attends staff meetings.

Essential/ Marginal (E or M)	Percentage of Time
E	12%
E	10%
E	20%
E	15%
E	15%
E	15%
E	5%
E	5%
E	2%
M	1%

3. Position's Supervisory Responsibilities:

If this position includes supervisory responsibilities, please indicate the state title and number of positions of the three highest subordinates.

<u>STATE TITLE</u>	<u>NUMBER</u>	
(1) EHM I	2	Number of employees directly supervised: <u>2</u>
(2) EHM II	1	
(3)		Total number supervised: <u>2</u>

4. Comments:

5. The above description is an accurate and complete description of this job.

Employee's Signature

Date

STATE OF SOUTH CAROLINA POSITION DESCRIPTION

1. Job Purpose:

Under general supervision of the Region 8 Shellfish Manager, assist in administering State and Federal regulations regarding the shellfish, beach monitoring, water quality, and non-point source pollution programs in Region 8 by conducting inspections and investigations, preparing and maintaining reports, and conducting sampling.

2. Job Functions:

1. Patrol coastal areas by vehicle and boat to ensure compliance with state and federal laws regarding harvesting, handling, and transportation of shellfish.
2. Sample shellfish management areas for data used to determine harvesting classifications and assess impact from point and non-point sources.
3. Upon request, assist the Office of Criminal Investigations personnel in law enforcement activities.
4. Perform all duties associated with the Region, State, and FDA shellfish/crab/fish inspection programs.
5. Prepare comprehensive reports of a technical nature. Assembles documentation for enforcement activities and recommends action for violations. Provides testimony at enforcement conferences, administrative hearings, and court hearings.
6. Transports and assists stream monitoring personnel with the collection of samples and recording of ambient data.
7. Maintains all shellfish equipment.
8. Attend staff meetings or training.
9. Other duties as necessary.
10. Complete in a timely manner administrative reports such as PCAS, shellfish reports and vehicle logs.

Essential/ Marginal (E or M)	Percentage of Time
E	25%
E	20%
E	1%
E	14%
E	15%
E	15%
E	5%
E	3%
M	1%
E	1%

3. Position's Supervisory Responsibilities:

If this position includes supervisory responsibilities, please indicate the state title and number of positions of the three highest subordinates.

<u>STATE TITLE</u>	<u>NUMBER</u>	
(1) _____	_____	Number of employees directly supervised: _____
(2) _____	_____	
(3) _____	_____	Total number supervised: _____

4. Comments:

Ability to bend, climb, and stoop in order to take samples and conduct inspections. to communicate effectively in writing and verbally; to lift 40 lbs; to work in all weather conditions; to walk on narrow cat walk which requires a sense of balance. Must have a valid driver's license.

5. The above description is an accurate and complete description of this job.

Employee's Signature

Date

1/27/10

STATE OF SOUTH CAROLINA POSITION DESCRIPTION

1. Job Purpose:

Under general supervision of the Region 8 Shellfish Manager, assist in administering State and Federal regulations regarding the shellfish, beach monitoring, water quality, and non-point source pollution programs in Region 8 by conducting inspections and investigations, preparing and maintaining reports, and conducting sampling.

2. Job Functions:

1. Patrol coastal areas by vehicle and boat to ensure compliance with state and federal laws regarding harvesting, handling, and transportation of shellfish.
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9. Other duties as necessary.
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Essential/ Marginal (E or M)	Percentage of Time
E	25%
E	20%
E	1%
E	14%
E	15%
E	15%
E	5%
E	3%
M	1%
E	1%

3. Position's Supervisory Responsibilities:

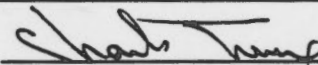
If this position includes supervisory responsibilities, please indicate the state title and number of positions of the three highest subordinates.

<u>STATE TITLE</u>	<u>NUMBER</u>	
(1) _____	_____	Number of employees directly supervised: _____
(2) _____	_____	
(3) _____	_____	
		Total number supervised: _____

4. Comments:

Ability to bend, climb, and stoop in order to take samples and conduct inspections. to communicate effectively in writing and verbally; to lift 40 lbs; to work in all weather conditions; to walk on narrow cat walk which requires a sense of balance. Must have a valid driver's license.

5. The above description is an accurate and complete description of this job.



Employee's Signature

5/24/2010

Date